The Builder.

VOL. LXVII. NO. 2695. SEPTEMBER 29, 1894.

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The New London Building Act.

THE code of regulations which has been the subject of so much animated and expensive discussion has now passed out of its transitory stage as "The London Streets and Buildings Bill" and received the Royal Assent under its permanent title, "The London Building Act, 1894," under which title it comes into operation on January 1, 1895, and will probably be for many years the controlling document for the regulation of building operations in the County of London. It becomes, therefore, a matter of considerable interest to most of our readers to consider what will be its practical effect in its final form, and how far the conditions of London building will be modified on and after January 1, 1895.

One of the best points about the new Act is that it is prefaced by a long array of "definitions." In the existing legislation definitions are few and not properly grouped; and lack of definitions is a fruitful cause of misunderstandings and disappointments. Of the subjects which are already defined under the existing law the following, viz., "Public Building," "External Wall," "Cross Wall," "Party Structure," remain the same in effect as at present, with some non-essential changes of expression. The definition of "Party-Wall" is essentially the same as at present, but it is rendered more precise in wording by making the sentence as to "different owners" a separate sub-clause in which the party-wall is defined as a wall "standing to a greater extent than the projection of the footing on lands of different owners," a detail which removes a possible ground of misunderstanding. The expressions "owner" and "building owner" retain their old definitions, but to that of "builder" we find the significant addition that where no person is employed in the usual capacity of a builder it shall mean "the owner of the building or structure"; an effectual stoppage of one loophole of evasion. "Street," which has only previously been defined in a by-law, here receives a definition which includes "road," "bridge," "lane," "mews," "footway," "square," "court," "alley," "passage," "whether a thoroughfare or not" (as at present); it may be noted that the word "mews" is an innovation in the definition. The term "way" includes such footpaths or passages as are not included in the preceding very comprehensive definition. The more important point to our readers is the "centre of the roadway," which with the "prescribed distance" (from the centre), retains in the main the same definitions as before, including that which provides that in the case of a street laid out after August 18, 1890, the superintending architect may define the line constituting the centre of the roadway, and this shall remain the legal centre even in case of the future widening of the street, which would leave the line out of the actual centre. There may be some purpose of simplification of working supposed to be served by this arrangement, but we confess we cannot conjecture what it is; and since the widening of any street would necessarily operate to relax, not restrict, any provisions as to distance of buildings from the centre, it will probably appear to most persons that it would have been an improvement to let the legal and geometrical centre coincide.

The term "site," which is defined in the Act of 1878, is not included among the definitions of the new Act. "Foundations," on the other hand, which in the 1878 Act was most inadequately defined as "the space immediately beneath the footings of a wall," is in the new Act much more precisely defined as "the solid ground or artificially-formed support on which the footings of the wall rest," and the word is further extended to mean "the bressummer" in the case of a wall carried by a bressummer, which appears a logical extension of the meaning; the "foundation" is whatever supports the base of the wall. The expression "base" applied to a wall is similarly extended to mean either the underside of the course above the footings, or the underside of the course laid on a bressummer. In the definition of "area" there is an important omission to be noted. Under the existing law the area of a building is "the superfices of a horizontal section of such building made at the point of its greatest surface, including the external walls and such portion of the party walls as belong to the building, *but excluding any attached building the height of which does not exceed the height of the ground storey.*" In the new Act the sentence in italics is excluded, the previous portion of the definition remaining the same. The alteration appears a perfectly sensible one, considering that in some cases the attached building not higher than the ground story may be an important adjunct—a large billiard-room for instance; and in fact there seems no adequate reason for the omitted sentence at all; but its omission is an important modification in the mode of estimating the "area."

On the rest of the definitions a few further notes may be made. A "new building" (a very important point in regard to the working of the Act) is briefly and clearly defined as either "any building erected after the commencement of this Act" (*i.e.*, after January 1, 1895), or "any building which has been taken down for more than half its cubical extent and re-erected, or commenced to be re-erected, wholly or partially on the same site after the commencement of this Act." In regard to this it will be seen that the alteration in the definition of "area" becomes important, and is in favour of the building-owner, as otherwise the authorities might have a claim not to reckon into the cubical contents the portions at present not included in the "area." This clause is one which has been stigmatised as oppressive, but not in our opinion justly. To pull down as much as half of a large building, and claim to re-erect it independently of the new Act, on the ground that it was "not a new building," might lead to the driving of a very large coach through the provisions of the Act; the clause is a wise and necessary one. "Bressummer" is now to be recognised in words, as it is tacitly already, as a wooden beam "or a metallic girder" carrying a wall. The expression "level of the ground," which in the working of some portions of the Act has a very important bearing, is the level of the ground as determined by the District Surveyor, or, in the event of disagreement, by the superintending architect or the Tribunal of Appeal. By clause 41 *f* (in the Section on "Open Spaces and Height of Buildings") we find that the District Surveyor will be bound to take the mean level (along the front of the building) as the level of the ground, in cases connected with the height of buildings. The terms "basement storey,"* "ground storey," "first storey," and "topmost storey" are sufficiently defined in a relative sense, and it will be important for speculating builders, who are much given to evasions as to the number of stories in their houses, to note that the topmost story is a

* The new Act adopts the spelling "storey," which may be defensible on philological grounds, though there is much more precedent for "story." It has the advantage, certainly of avoiding confusion with another word of a differen meaning.

story "whether constructed wholly or partly in the roof or not."* There is, however, no definition of a "storey" in itself, which was certainly required. We learn from the first schedule appended to the Act (of which more anon) that the height of a story is to be measured "from the level of the underside of the floor joists of the storey to the underside of the floor joists of the storey next above it," which gives us by implication the definition of a story; but "storey" should certainly have been included among the definitions; it is a word open to considerable latitude of interpretation, and in the existing Act it is stated that the height of a story is "the clear height exclusive of the thickness of the floor;" now we are to measure the height from the underside of the floor; and this important change is all the more reason for a direct definition.

"Party Fence-walls" are defined as now, but it is to be observed that they are no longer "exempt." "Party arches" are specially defined, being little more than the repetition of the definition of "party-wall," with the word "arch" substituted, so as to nullify any possible plea that an "arch" was not a "wall." The expression "height" in the measurement of buildings is defined as before. The "cubical extent" of a building, which becomes important in regard to the above-named definition of "new buildings," is defined as "the space contained within the external surfaces of its walls and roof, and the upper surface of its lowest storey," thus contradicting the received mode of estimating cubical contents, from the bottom of the footings.

"Fire-resisting materials" are defined by reference to the second schedule of the Act, which, as it is not long, we may give here:—

"The following materials shall for the purposes of this Act be deemed to be fire-resisting materials:—

1. Brickwork constructed of good bricks well burnt hard and sound properly bonded and solidly put together—
   a. With good mortar compounded of good lime and sharp clean sand hard clean broken brick broken flint grit or slag; or
   b. With good cement; or
   c. With cement mixed with sharp clean sand hard clean broken brick broken flint grit or slag;
2. Granite and other stone suitable for building purposes by reason of its solidity and durability:
3. Iron steel and copper;
4. Oak and teak and other hard timber when used for beams or posts or in combination with iron the timber and the iron (if any) being protected by plastering in cement or other incombustible or non-conducting external coating;

   In the case of doors:—

   Oak or teak or other hard timber not less than 2 in. thick;

   In the case of staircases:—

   Oak or teak or other hard timber with treads strings and risers not less than 2 in. thick;
5. Slate tiles brick and terra-cotta when used for coverings or corbels;
6. Flagstones when used for floors over arches but not exposed on the underside and not supported at the ends only;
7. Concrete composed of broken brick stone chippings or ballast and lime cement or calcined gypsum when used for filling in between joists of floors;
8. Any material from time to time approved by the Council as fire-resisting."

The closing sentence leaves it open to the Council to sanction any new material which may be proved to be fire-resisting, and quite rightly; in fact, the question of fire-resisting materials is more properly a subject for by-laws than for an Act. The admission of oak and teak into the catalogue, in certain minimum thicknesses, is an important step. But there is some confusion of method and principle in the Act as to this question of fire-resisting materials. The word "incombustible" is used several times in the Act, and it is not very clear whether or not we are to regard "incombustible" and "fire-resisting" as convertible terms. This should certainly have been plainly stated; and if this were *not* intended there should have been another schedule of substances accepted as "incombustible." In the body of the Act there is obvious confusion on this point, for in clause 74 (2), where provision is made for the separation in certain classes of buildings of the dwelling portion from the trade portion, it is allowed that there may be openings "fitted with fire-resisting doors." This would allow of oak doors of not less than two inches thick, but under 77 *(b)*, "rules as to uniting buildings," doorways in party-walls must have wrought-iron doors; yet the iron and oak doors are grouped together in the schedule as "fire-resisting." Then again, the schedule includes "granite or other stone suitable for building purposes," substances which are incombustible but are certainly *not* "fire-resisting." Yet clause 68, as to stairs in public buildings, merely specifies them to be "fire-resisting," and therefore according to the new Act people may still go on building stone stairs as fire-proof stairs, though it has long been recognised that stone is one of the worst materials for the purpose. This is a decided oversight, and though no good architect would follow the Act in this respect, the wording of it leaves the official authority no power to condemn a stone staircase. On the other hand it should be noted that an architect can now build oak stairs in a public building without infringement of the law.

Lastly we have certain important definitions as to classes of rooms and buildings. A "habitable room" is now distinctly defined. It is a room "constructed or adapted to be inhabited," and "inhabited" means a room in which some person passes the night, or which is used as a living-room, including a room (probably this means in connexion with a room) in which it is presumed that some one passes the night. This is perhaps the most convenient method of arriving at a definition, though on sanitary grounds the restrictions as to "inhabited" rooms ought to apply almost equally to those in which people habitually pass the whole of their working hours, even when not sleeping there. The difficulty would be, of course, to settle on any logical ground what precise number of hours of occupation were sufficient to constitute an "inhabited" room. As it is, the line is drawn between sleeping and not sleeping in a room, and no doubt the distinction is an important one. As to classes of buildings, a "domestic building" is defined as at present, in negative terms, as one not belonging either to the "public building" or "warehouse" class. Public buildings are defined as at present, but with the addition of "public place of assembly," which includes any building in which people are to meet in large numbers for any purpose besides those directly specified; and there is the further important addition of

"Any building constructed or adapted to be used as an hotel lodging-house home refuge or shelter where such building extends to more than two hundred and fifty-thousand cubic feet or has sleeping accommodation for more than one hundred persons."

It will thus be seen that in future all hotels above a certain size, which, under the existing law, are domestic buildings, will be classed as public buildings and be subject to the same conditions. The present definition of the "warehouse class" is extended by the addition of the words "any other building exceeding in cubical extent one hundred and fifty thousand cubic feet which is neither a public building nor a domestic building."

The most extraordinary thing in connexion with the subject of definition is that, like the existing Acts, the new Act for the regulation of buildings in London contains no definition of a "building"! Surely a most curious omission, and one likely to leave matter for disputation in the future. From the first schedule we learn that "every building unless otherwise sanctioned in accordance with the Act shall be enclosed with walls constructed of brick stone or other hard and incombustible substances"; whence we may perhaps conclude that structures destitute of these qualifications are not properly speaking buildings; but as to what properly constitutes a "building," the new Building Act gives us no positive definition whatever.

From the definitions we pass to the regulations for the formation and widening of streets. These include some portion of the regulations formerly laid down under by-laws, but now forming part of the new Act. Streets henceforth are not to be widened, altered, or adapted save in accordance with the provisions in this portion (Part II.) of the Act. Though rather differently worded, the provisions for application to the Council, depositing plans of the street, &c., are practically the same as before, as also the requirement of 40 ft. width for a street for carriage traffic and 20 ft. for foot traffic. The proceedings which are considered to constitute the commencement of the laying out of a street are however defined (we have before referred to these), coupled with the rather curiously-worded exception that "no person shall be deemed to commence to form or lay out a street if he do any of the acts in this section mentioned for some purpose other than that of forming or laying out a street." Who is to be the judge of the "purpose" with which the acts referred to are done? Then seven cases are given in which the Council may refuse to sanction a street, or may sanction it subject only to prescribed conditions. The first five of these are only different and more precise statements of existing regulations; the others are (6) where it is proposed to be laid out for carriage traffic with a gradient steeper than one in twenty; and (7) where it is proposed to be laid out in such a manner as to be in contravention of any by-law of the Council. If the Council do not give notice of their refusal to sanction within two months they shall be considered to have sanctioned it. The regulations as to the adaptation of "ways" to streets are practically a repetition of the same conditions as in regard to new streets. Clause 12 empowers the Council to require a greater width than forty feet, but not more than sixty, where they consider a wider street desirable. On the inadequacy of this provision for wider streets we have already expressed our opinion, and must regret to find it stereotyped in the new Act; a mistake which will be found out sooner or later. Clause 13, on the position of new buildings with regard to streets, in its first two paragraphs merely puts the same provisions in terms of building on the line of street instead of in terms of street-making, with leave of appeal to the Tribunal, on the part of the building owner. Subsequent paragraphs, however, provide that the Council may give special consent for the advancement of a building beyond the "prescribed distance" from the centre of the roadway (such consent not to affect the rights of owners of adjoining land*), and that anyone wishing to alter or re-erect a building which within seven years† previous to the passing of the Act has stood within the "prescribed distance," may do so on the production of satisfactory plans showing the position of the older structure; with the proviso that no building inhabited by persons of the working class shall be erected within the "prescribed distance" to a height greater than the distance between its front wall and the opposite houses. This is probably one of the most extraordinary sentences ever seen in a legal document professing to be issued in the public interest. Why are the working classes to be thus nursed? and who are the "working classes," and who is to define them? No definition is attempted in the Act. In the case of any building carried beyond the "prescribed distance," except under the above-mentioned conditions, the Council may require the demolition and re-erection of the offending portion within the prescribed dis-

† We not infrequently receive letters from builders enquiring whether a house, of which they send a rough section, is of two or three stories; enquiries obviously prompted by some probably very proper pressure put on them by the local District Surveyor, who regards as a three-story house what they wish to regard as a two-story one.

* Query:—For "rights" read "duties"?

† It may be noted that in this and several other clauses the term of "seven years" previous to the commencement of the Act is substituted for the term of "two years" in the existing law.

tance. For any case where the Council require a greater width than 40 ft. in a road, or make such width a condition of their sanction, a compensation clause is provided.

Similar considerations as to the prescribed distance govern the adaptation of a "way" to a highway. As, where the highway is in existence first, the building may not encroach except under the conditions provided; so where the building has encroached, the "way" is barred from being adapted as a highway. The Council may also sanction the encroachment of buildings within the prescribed distance for a limited time only, to be specified in their sanction. Nothing in this part of the Act, however, applies to any private road formed by any railway company for approach to a station-yard or to land used for railway purposes; the clause showing a tenderness for railway companies which is apparent throughout the Act. Where such roads are only lined by walls it is of little consequence. But how if they are lined by houses, perhaps occupied by the "working classes" (railway employés possibly)? This portion of the Act also is not to operate in regard to buildings erected on any land belonging to the School Board for London or over which they have powers of compulsory purchase: a proposition equally questionable—why is the School Board to be allowed to encroach, and thus set the bad educational example of traversing a law made in the public interest? Surely compensation might have met their case.

In the Part III., dealing with Lines of Building Frontage, the "fifty-feet clause," as it may be called, remains as before, with the same exception found in a good many other cases, that it does not apply to land which had been "lawfully occupied by a building or structure"* within seven years previous to the passing of the Act. To this follows, with little difference of wording, the present provision for the setting back of buildings of which more than half the cubical extent shall have been demolished. To the general provision that the Council, in giving consent to an encroachment beyond the line of frontage, may attach any conditions to such consent, is added the statement of two special conditions which the Council may have power to require, viz., that land in front of the favoured building shall be dedicated to and left open for the use of the public, and that the building shall be used only for such purposes as are specified in the consent, except by further consent obtained. The proviso that consent to the encroachment of a special building beyond the line of frontage does not alter the general line of buildings in that or any other part of the street is only a cautionary notice, making the point more clear; the fact is the same under the existing law.

Part IV., on the Names and Numbering of Streets, may be passed over here, and we proceed to the important section on "Open Spaces about Buildings and Height of Buildings" (Part V.). The first clause of this (39) exhibits another irregularity as to definitions, for we have a new definition of a "domestic building" other than that in the list of definitions. In the former a "domestic building" (as at present) is anything that is not either a "warehouse" or a "public building"; but "for the purposes of this part (Part V.) of the Act the expression 'domestic building' shall not include any buildings used or constructed or adapted to be used wholly or principally as offices or counting-houses." The reason for this is obvious when we peruse Part V., but it would certainly have been more business-like to have added one more class in the definitions, between domestic building and warehouse; the expression "office buildings" would have answered the purpose perfectly well. As it is, we have the words "domestic building" confessedly having one meaning in one part of the Act and another meaning in another part; which is absurd, and is one among various indications that the final polishing of the details of expression and definition in the Act has been too hurriedly gone through.

Clause 40 is a new provision, in the case of domestic buildings having a habitable basement, for an open space of an aggregate extent of not less than 100 square feet free from any erection thereon above the level of the adjoining pavement, for the purpose of giving light and air to such basement. This is coupled with the rather obscurely worded exception that such "open space notwithstanding anything hereinafter contained need not necessarily adjoin the rear boundary of the premises." What is the special point of this exception we confess that we have failed to comprehend, unless it means that the space for light and air to the basement may be at the side instead of at the rear. This seems probable in connexion with the wording of Clause 41, but it is not clearly expressed. It may perhaps be explained by reference to Clause 29 of the 1855 Act, which provides that "every building used or intended to be used as a dwelling-house, unless all the rooms can be lighted or ventilated from a street or alley adjoining, shall have in the rear or on the side thereof an open space exclusively belonging thereto to the extent of at least 100 square feet." Apparently the provision intended in the 1855 Act for a whole house is now applied to habitable basement rooms. Clause 41 practically re-enacts Clause 14 of the Act of 1882, but in simpler language; any building abutting upon a street already formed shall have in the rear an open space exclusively belonging to it of not less than 150 square feet, the entire width of the building, and to a depth in every part of at least 10 ft. from such building, free from any erection except a closet or privy and a receptacle for ashes, none of such erections to exceed 9 ft. in height. A modifying clause provides that where there is a basement story sufficiently lighted (*i.e.*, we presume, from the side), or where there is no such basement story and the ground story is not constructed to be "inhabited" (in the legal sense before referred to), the open space may commence at the level of the ceiling of the ground story, or at the level of 16 ft. above the adjoining pavement. This allows for the prolongation of shop premises into the rear of the property. Then follows the provision (clause 41, iii.) to which so much attention has been drawn, in regard to the height of such buildings, with reference to the open space, when abutting on streets laid out after the commencement of the Act. The form in which this provision appeared in the draught Bill we have in a previous article quoted and commented on (*Builder*, Dec. 23, 1893, page 462); it is not well expressed, but is intelligible. The modification in the Act as passed is that the "diagonal line" may be at an angle of sixty-three and a half degrees with the horizontal line, in place of the originally-suggested forty-five degrees, which is sufficient for general purposes, and perhaps more in accordance with the rights or reasonable claims of property-owners than the angle of forty-five degrees. Chimneys, dormers, gables, or turrets may extend above this "diagonal line," provided they are not in the aggregate of more than one-third the width of the rear elevation of the building. When the pavement in front of the building is not on one level the "horizontal line" is to be drawn at its mean level; and in the same sense where the rear boundary of the "space" is not parallel with the rear wall of the building the mean distance shall be taken as the starting-point of the diagonal line, "whether such point be beyond the said boundary or not." When the line is so irregular in shape that a doubt arises as to how the measurement shall be taken application is to be made to the Council, or (in case of dissatisfaction) to the Tribunal of Appeal.* In a case where the land at the rear of a building and exclusively belonging to it abuts upon a street or on an open space the maintenance of which is secured permanently to the satisfaction of the Council, the horizontal line shall be produced and the diagonal line may be drawn from the centre of such street at its surface level, or at the further boundary of such open space, and no open space need be provided specially appertaining to the building.

In the case of a building at the corner of two streets, or abutting on one street and on an open space not less than 40 ft. wide permanently secured as open, the Council may permit the erection of buildings not more than 30 ft. high on such part of the space in the rear as they may think fit (not interfering with access of light to neighbouring buildings), and corner buildings may be returned to the same height as the diagonal line allows to the front building for a distance of 40 ft., "or for such less distance as the requirements for open space at the rear may demand." In special cases of very irregularly-shaped sites the Council may make special modifications, not interfering with "due access of light and air." The "due access" is apparently left to the determination of the Council (subject to appeal). Domestic buildings abutting on a street laid out *before* the commencement of the Act may be regulated as to height by taking the horizontal line at a level of sixteen feet above the adjoining pavement and the open space provided above the level of this horizontal line, "except in the case of dwelling-houses to be inhabited or adapted to be inhabited by persons of the working class;" a repetition of the absurdity we have already commented on, and which in this case leaves a double problem—first, to define (legally) "the working classes," secondly, to define a house "adapted to be inhabited" by them. These provisions we take to be in reality bids for the working-class vote on the part of the Council. That such bids should be made on the part of a body of such political prejudices as the London County Council has turned out to be need surprise no one; but that they should be solemnly incorporated in an Act ostensibly designed for the general public welfare is contemptible.

The letter of the law as to the diagonal line may be overpassed in cases where the Council or Tribunal of Appeal is satisfied that an open cubic space of air will be provided at the rear of the building, equal to the open cubic space which would have been provided if no part of the building had extended above the diagonal line in accordance with the previous requirements. It is rather difficult to see how this could be, and the phrase looks like a contradiction in terms; but it is satisfactory as indicating a disposition to allow of reasonable departure from the hard-and-fast lines of the Act. It is also provided that nothing in this section of the Act applies to houses abutting on the river Thames or on a public park or on an open space of 80 ft. in depth which is secured as such.

Clause 42 provides specially for dwellings for the working classes, *i.e.*, "adapted to be inhabited" by them, whatever that may mean. Every person intending to erect such a dwelling must submit plans showing the extent and height of the proposed building and its position in relation to every other building existing or in course of erection "which is adjacent thereto." It would be interesting to know what is the legal definition of "adjacent." The Council may refuse to sanction such plans in any case where they are of opinion that there is not sufficient open space for the admission of light and air, provided that the refusal must be given within one month from the depositing of the plans. Why such a provision is confined to

* The phrase suggests another question *in re* definitions: what is the difference between a "building" and a "structure"? They seem to be assumed to have different meanings, but neither is defined in the Act.

* The Tribunal of Appeal differs in one important point from the Tribunal under the existing law. Two members, as at present, are to be appointed respectively by the Institute of Architects and the Surveyors' Institution, but the third is to be appointed not by the Council (as at present) but by the Secretary of State, and no one of the three may be a member or officer of the Council.

houses "adapted to be inhabited by the working classes," when it might equally and with the greatest benefit be applied to all cases of blocks of houses in flats, it is impossible to imagine, except for the semi-political reason above suggested. Clause 43 provides that a person intending to erect a domestic building on a site occupied by a domestic building within seven years previous to the commencement of the Act, may erect the new building on the same site and under the same conditions on the deposition of plans showing accurately the position and extent of the previous building. Deviations from the certified plans may be permitted at the discretion of the Council and on appeal to it. These provisions again do not apply to "dwellings for the working-classes."

Anyone desiring to re-arrange a cleared area formerly occupied in whole or in part by buildings by laying out new streets or widening streets, &c., may apply and deposit plans and sections, and the Council may if they think it desirable modify or relax, for this case, any of the foregoing provisions of Part V. of the Act.

Clause 45 is an important new legislation in regard to open courts within buildings. Where such a court wholly or in part open at the top but enclosed on every side is used for admitting light and air to a domestic building, and the depth of the court from the eaves or parapet to the ceiling of the ground story exceeds its length or breadth, a communication between the lower end of the court and the outer air must be maintained for ventilation. This ought to apply equally to blocks of offices, which by the special definition of "domestic building" applied, as aforesaid, to this section of the Act, are constructively deprived of the advantage of this sanitary regulation; a distinct and serious oversight. The same clause provides that no habitable room having no window except into an enclosed court shall be constructed unless the width from the window to the opposite wall equals half the height from the sill of the window to the eaves or parapet of the opposite wall; but a court of which the greater dimension does not exceed twice the lesser dimension shall be held to comply with the provision if a court of the same area but square on plan would comply literally with it.

Clause 46 provides that the superintending architect shall determine which is the front and which is the rear of any building; a very necessary clause, considering the direct efforts that have been made on some London estates to evade the existing provisions by erecting blocks with "two fronts."

Clause 47 fixes the limit of height for all buildings except churches or chapels to *eighty feet* (exclusive of two stories in the roof, and of ornamental towers, turrets, or other architectural features), except by consent of the Council. The limitation, it will be seen, is pretty well watered down, and it does not apply to buildings contracted for before the passing of the Act. Where existing buildings forming part of one block or row exceed the prescribed height at the commencement of the Act, other buildings in the block belonging at the same date to the same owner may be hereafter carried to the same height as the first-mentioned building in the block. When in other cases the Council may consent to the erection of a building to a greater than the prescribed height, a notice of this consent is to be published within a week after it has been given, and the consent is not to be acted upon till twenty-one days after such publication.

A further provision as to height of buildings is made in Clause 49, that in any street laid out after August 7, 1862, and less than 50 ft. wide, no old building shall be raised and no new building erected to a greater height than the distance to the opposite wall of such street. That is to say, that streets under 50 ft. wide shall not have buildings higher than their width. It is noteworthy that in this clause nothing is said about excluding the roof from the reckoning of the height, so that according to the wording of the clause the highest part of the roof must not be higher than the width between the buildings. This (unless it is an oversight) is almost more stringent than necessary; and, on the other hand, the change in the conditions when we come to 50 ft. wide is a curious anomaly. A street 49 ft. wide must not have buildings higher than 49 ft. to the top of the roof; a street 50 ft. wide (the width of Long Acre) may have buildings 80 ft. high on each side, exclusive of two stories in the roof. It seems impossible that this can long be left without some attempt at amendment.

It is allowable (Clause 50) to increase the height of a topmost story (in existing buildings we presume) to such an extent as to bring any habitable room constructed in it into conformity with the provisions of the Act as to habitable rooms; and any dwelling-house (clause 51) for persons of the working class previously erected by a local authority and above the prescribed height may be rebuilt to the same height and for the same purpose, but of not greater dimensions (in area) than the previous building.

By Clause 52 a domestic building and a stable building on a site abutting on one side on a street and on the other side on a mews may, under certain conditions as to the width between them and the height of the stable-building, be regarded as one domestic building with the rear abutting on a street; and this whether in one occupation or not.

This is the last of the provisions for the placing of buildings; in our next we will summarise and consider the new provisions in regard to their construction.

SCARCITY OF WATER IN LONDON.

THE Metropolitan water-supply question is assuming a very serious aspect, for a great number of houses in North and East London are now absolutely without water during the night. The Hackney Vestry ventured a few days ago to call the attention of the East London Waterworks Company to this fact, and the latter has vouchsafed a reply which reveals a most astounding anomaly. The company explains the matter by saying that the "shutting down the service mains in certain parts of the district during the night . . . was rendered necessary, as the storage in the reservoirs had fallen far below the usual quantity, owing to the deficient rainfall, and the consequent non-repletion of the springs, which suffered from the drought of last year." In other words, the quantity of water at the directors' disposal, under existing circumstances, is not sufficient to enable them to provide a continuous day and night service. They tell the vestry plainly that "it is absolutely essential, and imposed, indeed, by the Public and Private Water Acts, that proper provision should be made in each house for storing a sufficient quantity of water to meet emergencies," and that if this were done the fact of their cutting off the supply would be "practically unfelt." They state that by their present action "upwards of 10 million gallons are conserved each night for distribution during the following day."

Here we have food for very solemn reflection. Traversing the company's statements we cannot help thinking that the directors have either grossly exaggerated their present position, or that, in view of the circumstances, the evidence given on their behalf before the recent Water Commission was extremely inaccurate. It will be noted that their excuse for not supplying a constant service in the districts alluded to is that they have not yet got over last year's drought. It is not our present purpose to inquire whether the rain fallen since that drought is in reality insufficient to raise the underground water level to its normal height—that would require a special investigation. But we may strike at the root of the matter by inquiring, if the drought is responsible for the curtailment of the supply—if the water-level in the chalk in the Lea area is actually below its average height—why did the East London Company, when its representative was before the Water Commission, propose to obtain a further 13,000,000 gallons per day by sinking wells in the chalk? Or, is it that a considerable proportion of this 13 million gallons is now being drawn and the water-level is affected thereby? It makes very little difference which way we regard the matter. If the company is not drawing from the extra 13 million gallons, it is clear that it ought not to do so, for it would be merely impoverishing the stream. On the other hand, if it is drawing from this contemplated quantity, is it right to say that the present low state of the springs is altogether due to "the drought of last year?" Of course, we are perfectly well aware that according to the evidence of a certain witness before the Commission "there is something peculiar in the geological structure of the lower part of the Lea valley which enables it to yield an unusually large quantity of water," and we are familiar with the disposition of the strata concerned, and the views as to the direction of flow of the underground water. But we are also aware of the statement by another witness with reference to the point under discussion—namely, that if the New River and East London Companies together abstracted 30 million gallons a day from wells in the Lea valley they would lower the outflow of the higher streams; he said "I do not see how you can possibly take a large amount of water out of a chalk reservoir and not affect the streams." And, in our opinion, this witness was quite right. If the drought of last year was capable of producing such a disastrous result, surely the effects of future droughts ought not to be augmented by the artificial abstraction of water. However, we let that portion of the East London Water Company's letter pass.

The consumers have it thrown in their teeth that, by law, "proper provision should be made in each house for storing a sufficient quantity of water to meet emergencies." This is a fine state of affairs, after the consumer has abolished the cistern and gone to the expense of fitting up his house with regulation taps and appliances to suit the requirements of the constant service system! Where are the boasted advantages of "constant service" from the hygienic point of view, if the cistern is not to be done away with? The struggle with the water company for a continuous supply will have been in vain so far as domestic purposes are concerned.

The directors say that by cutting off the water during the night they are enabled to save upwards of 10 million gallons for the next day's supply. This we are utterly unable to grasp. The gross supply *per diem* by the East London Company is, in round numbers, 40 million gallons, according to the Report of the Royal Commission. It will be noticed that the 10 million gallons are reputed to be conserved by shutting down the service mains in "certain parts" of the district only, not by closing the whole. We do not know how many hours are included in the term "night," but it cannot be many more than eight hours. Putting a liberal construction on the term "upwards," and making a fair allowance for the use of water during the night in those portions of the East London Company's district not cut off, we may add, say, about 3 million gallons, making a total of 13 million gallons for the night supply, assuming the saved 10 million gallons were served out. We are now faced with a curious anomaly: the quantity used during the eight hours at night is as great as that used during each of the eight hours in the daytime—which is absurd. If it is not absurd, and the 13 million gallons are really used in the eight night hours, then it is nothing short of a crime that the inhabitants should be deprived of as much as 10 million gallons at a period when they appear to require it so urgently.

It is possible that a large portion of the 10 million gallons is derived from prevention of waste; but waste takes place quite as much in the day as in the night, and the relation of the figures will thus remain the same. But whilst on this topic we cannot refrain from noting the reckless manner in which the classes constituting the large majority of the East London Company's customers waste the water. A staff of over thirty inspectors constantly employed (and authorised to re-leather taps without charge) is incompetent to prevent this waste, because it is not mainly due to defective fittings, but to the fact that taps are deliberately left running for hours and sometimes for days together. It appears to us that instead of depleting the rivers and brooks in outlying districts by spending more money in well-extensions, the company would be better employed in exercising a yet stricter supervision over this wanton waste.

In concluding their letter to the Hackney Vestry, the Directors remark that "the additional powers granted the company in the (Parliamentary) Session just past will enable the Directors to increase their storage capacity in order to meet such a contingency as has now arisen." Then follows a somewhat bitter recrimination, which to the ordinary reader might seem to account for much of the Directors' attitude in this matter, did he not know that such a body would be incapable of allowing it to influence them in the slightest degree. It runs—"Unfortunately, the application for similar powers was rejected by Parliament last year, otherwise the works of extension which the Directors had already resolved upon would ere this have been well in hand." From which we are led to understand that the prime cause of the curtailment lies at the door of that convenient scapegoat—Parliament.

The Hackney Vestry will have the matter under consideration at their next meeting; but, in the meantime, the committee to which the matter has been referred will try to ascertain by what authority the company are acting in thus dealing with their consumers in such a summary manner.

NOTES.

IN the first portion of our report of the Congress of Hygiene we published (page 188, *ante*), a series of six resolutions proposed by Professor Corfield at the Congress of Hygiene at Budapest, clinched by a concluding resolution recommending that public authorities should pass regulations to enforce these provisions. To the advanced English sanitarian they seem not only innocent but almost matter-of-course proposals; but, as will be seen from the continuation of the report of the Congress in the present issue, the consideration of them raised a storm among the foreign sanitarians, or, as we should call them in this case, *in*-sanitarians. The sweeping condemnation of back-to-back houses seems especially to have stirred them to so much wrath that Professor Corfield suggested as an explanation that the foreign members had not properly grasped the meaning of the phrase. Our impression is, however, that they understood well enough what it meant, but that the Germans are so much behind us in sanitary experience and insight that they have not yet learned to regard even as questionable arrangements which we have long ago seen reason to emphatically condemn. Certainly, the spectacle of learned professors at a Sanitary Congress losing their temper because it is proposed to deprive them of the privilege of building back-to-back houses is a melancholy though instructive one. The fact at all events goes to show that International Congresses of Hygiene are not superfluous, and may carry sanitary light where it is much wanted. Professor Corfield's resolutions, though there was obviously no chance of passing them at the present Congress, are however to be relegated to a committee, and there is yet time for enlightenment to descend on the back-to-back minds. The meeting place selected for the next Congress, Madrid, is not however a promising locality for securing the passing of sanitary enactments; but we must hope for the best. The very novelty of the thing may render sanitation an unexpected attraction to the Spaniard.

UNDER the title of "Contributions to the History of Olympia" (Olympische Beiträge), Dr. Konrad Wernicke publishes in the new number of the *Archæological Jahrbuch*, a paper on the Heraion at Olympia, which is of considerable interest to architects as well as classical students in general. According to Dr. Wernicke, whose views we can here only summarise, this ancient temple, which was at first the seat of the conjoint worship of Zeus and Hera, lost much of its religious prestige when the great temple of Zeus was built. The main point is that about the time when the Emperor Nero visited the place it was transformed into a sort of art museum—such it certainly was when Pausanias described it, as he notes numbers of statues which, invaluable as they were from the point of view of art, had nothing whatever to do with the worship of Hera. At the same time the projecting walls (like internal buttresses), which have their close analogy in the Temple of Apollo at Bassæ, and which in a structure of clay and wood had their obvious structural use, were abolished; they were useless in a temple the whole structure of which was made of stone, and considerable space for museum purposes was thereby gained. Respecting these partition walls, Dr. Wernicke has an interesting theory. He thinks they had a ritual as well as structural design. He conjectures that as the number of the partitions was sixteen, and as sixteen was the number of the priestesses who wove the peplos for Hera, the temple may have been in its early days a literal γυναικωνῖτις (women's chamber) where the women wove their sacred web. This is the more probable as we know that they were divided into two bands of eight each, which would well correspond with the eight niches on either side of the temple.

THE *Academy* announces that the contents of the Ashmolean Museum are now being removed into the new buildings which have been erected, by Dr. Drury Fortnum's munificence, near the University Galleries, St. Giles's. It will be remembered that six years ago Dr. Drury Fortnum presented to the University the larger portion of his valuable collection, so rich in bronzes, terra-cotta, sculpture, and faïence, which he had lent for exhibition at the Ashmolean. The old museum will, it is stated, be absorbed into the Bodleian, for which further space is needed. It was built by Thomas Wood in 1680-3, from Wren's designs, and in 1863 was renovated by C. Buckeridge, and rearranged for a museum of antiquities, with an examination-room in its third story. J. S. Duncan, appointed curator in 1829, sorted and arranged the whole collection, greatly enlarged by subsequent additions to the original gift by Ashmole, which included the multifarious contents of the Tradescants' house, or "Ark," at Lambeth, whereof we gave an illustration in our number of June 18, 1892. Ashmole's association with Oxford extended over a part of the time during which a branch of the Royal Society met there; he had entered of Brasenose College when the city was garrisoned by the King's army, in which he served as a gentleman of ordnance. The son of a saddler at Lichfield, he practised for a while as a solicitor, and, besides his other attainments, was a leading authority upon medals and coins.

A REPORT by Mr. Wike, the City Surveyor of Sheffield, on granite paving, gives some useful information as the result of observations on the use of granite setts for street pavement. The general conclusions to be drawn from the report are in favour of granite paving. It is shown that of a good many accidents from horses falling, attributed to the slippery quality of the granite paving, a considerable proportion did not really take place on the granite paving, and that the reports were consequently misleading and exaggerated. In the course of Mr. Wike's report the following points are urged. In the case of tramway streets the tramway company, who have to maintain a width of 16 ft. in the centre of the street, would object to keep in repair any material less durable than granite, as it would entail on them additional expense. A schedule is given of information supplied by the Surveyors of twenty-nine towns in England in which granite pavement is largely used. The observations of these Surveyors as to the durability of granite pavement are very striking. The Glasgow Surveyor says "40 years and another 30 after redressing." Sunderland, "40 years, and then can be taken up and laid elsewhere." Dublin, "30 years; still in fair condition;" Bury "paving down 8 years, and not a penny spent; say 30 years, then redressed, and 20 years more." Most of the reports are to a similar effect. In Sheffield the granite streets recently laid have been in very flat sections. From various indications in the report it appears that the chief danger of falls for horses is at the side portions of the streets where the section is rather rounded. The roads laid with "Gritstone" compare with granite very unfavourably as to wear and ultimate cost. The "Gritstone" pavement in High-street, Sheffield, was laid in 1891, cost 10s. 6d. per yard, has been occasionally repaired, and will soon have to be relaid. Some of the grit-setts taken up in 1891 had worn from 10 in. to 4 in. or 5 in. thick; but the time they had been down is not stated. The gritstone laid down in 1891 was not on concrete, but the Surveyor states as his experience that the gritstone pavement wears as quick if not quicker on concrete as on an ordinary foundation. In regard to the life of paving materials Mr. Wike estimates granite as 20 to 30 years with few repairs, gritstone 3 to 8 years, wood (deal) 5 to 7 years. This is on streets not subject to traction-engine traffic. The comparative cost of wood and granite paving as computed by the city of Manchester is given as follows:—

WOOD, AVERAGE LIFE, 15 YEARS.	s.	d.	GRANITE, AVERAGE LIFE, 30 YEARS.	s.	d.
Initial cost	14	6	Initial cost	10	6
Cost of taking up, cleaning and re-paving blocks once during lifetime ...	4	3	Cost of repairs, 30 years, at ½d. per yard	1	3
Cost of ordinary repairs, 15 years at ½d. per yard	0	3½		11	9
	19	0½	DEDUCT—	s.	d.
DEDUCT value of concrete foundation	2	0	*a*. Value of foundation	1	0
			b. Value of old setts at time of renewal	3	4½
				4	4½
Total cost for 15 years.....	17	0½	Total cost for 30 years.....	7	4½
Average cost for one year say, 1s. 1½d.			Average cost for one year, say 3d.		

It is admitted that granite becomes slippery without constant cleansing. The Paving and Highways Department of Manchester reports that granite pavements have been used for fifty years in their principal streets, "and have answered well when the streets have been properly cleansed, watered, and sanded." In regard to the sanding it appears from other information included in the report that liberal sanding is much desired by horse-owners, and is always effectual in removing slipperiness, but that it becomes a nuisance to shopkeepers from the sand blowing about. In Manchester wood-paving is being adopted solely on account of its comparatively noiseless character; it is considered to have no other advantage. The Manchester Paving Department, however,

reports that crossings in a particular district paved with small 4-in. granite cubes were found to be much more slippery than the larger setts.

THE thirty-eighth Annual Report of the Vestry of Chelsea has been issued. It has been resolved to light the Town Hall by electric light, and a sum of 277*l.* has been included in the estimates for the coming year for this purpose. The Vestry, which declined to lay down wood-paving in William-street, Lowndes-square, as long as the private bars in Lowndes-square and Lowndes-street remained, have now, on the removal of the bars, laid down the new paving. Sloane Gardens has been taken over by the Vestry as a "new street," subject to certain conditions. The Vestry has opposed the charges of the water company against consumers for putting in stop-valves in the public footways in connexion with constant supply, and has reported that it rests entirely with the consumer to determine where the stop-valve shall be placed, and that the company has no power to require a person who has a stop-valve within his premises to have it removed and placed outside in the public footway. Representations have been made to the London County Council with a view to the construction of a bridge for carriage traffic over the canal at Wedlake, in place of the existing footbridge. In regard to the question of "the unemployed" a deputation of various associations in the parish waited on the Vestry in December to urge that the Vestry should provide work, such as cleansing public streets, &c., in accordance with the provisions of the Public Health (London) Act, 1891. On the consideration of the matter it was reported that the provisions of the Act were being efficiently carried out, and that there was no productive work which could be put in hand immediately for the relief of the unemployed. A heavy fall of snow, however, in January, was taken as an occasion for the employment of 2,673 men at a total outlay of 524*l.* 3s. 3d. In regard to water supply it is noted that the Chelsea Waterworks Company are still at the bottom of the list of London water companies in regard to the extent of constant supply afforded. The interposition of the London County Council has, however, had the effect of raising the percentage of constant supply from 40 to 45 per cent. Certain isolated portions of the east end of the parish have been given a constant supply voluntarily by the water company.

ON November 28, 1862, were sold by auction the main buildings of the College of Advocates—commonly called Doctors' Commons—consisting of the court-house, hall (with a library on its upper floor), Great, Little, and Garden-courts, and a large garden. Covering nearly one acre, they stood on the ground bounded by Knightrider-street, Bennet's Hill (Godliman-street), Addle Hill, and the present Queen Victoria-street. The site is now occupied by the Civil Service Stores and Post Office Savings Bank in the last-named thoroughfare. In about the middle of the sixteenth century Dr. Henry Harvey, master (1555-85) of Trinity Hall, Cambridge, obtained a lease from the Dean and Chapter of St. Paul's, at five marks per annum, of Mountjoy House, on the site we describe. Thither the college migrated, to live and dine in commons, from some meaner quarters at the Queen's head, in Paternoster-row. Mountjoy House, a stone structure, was consumed by the Great Fire, and rebuilt upon a more commodious plan for the advocates and proctors. The principal entrance was in Knightrider-street: next south of the Bennet's Hill gate was the entrance, westwards, into some tenements which the Dean and Chapter's leases described as "Camera Dianæ," being so termed, the story goes, from an abode there of Fair Rosamund. The Admiralty Court, established in Southwark *temp.* Edward III., was removed *circa* 1675, to Doctors' Commons, from St. Margaret's Church in the Borough, and again in 1860 to an upper room of the Law Courts, Westminster Hall. The late Probate Court and Prerogative Will Office stood on the site of the Savings Bank; the wills were taken thence to Somerset House in 1874. Various subsidiary offices were kept in houses near the main buildings. The Vicar-General's and Archbishop of Canterbury's Registry, Commissary and Consistory Courts, Bishop of London's Marriage Licence Office, &c., have for long been domiciled at No. 5, Dean's-court, between Carter-lane and St. Paul's Churchyard, a home of Sir Herbert Jenner-Fust, dean of the arches, and master of Trinity Hall, *ob.* 1852. That house, by direction of the Ecclesiastical Commissioners, will be vacated to-day (Sept. 29), for an extension of the Savings Bank, the Post Office authorities having already secured the ground between Carter-lane and Knightrider-street. Dean's-court is marked for further change; the enlargement of an adjacent warehouse will involve the speedy demolition of the red-brick house, with a decorated stuccoed front, that stands over the archway in St. Paul's Churchyard: a house, according to tradition, occupied by Wren as his offices for some term during the building of the Cathedral. He is said also to have resided in Shoemakers'-row, Carter-lane. Wren designed the deanery-house, Dean's-court (1684), the Chapter House (1712), and St. Bennet's, Paul's-wharf (1677-83), erected by Thomas Strong and E. Strong, the elder, masons, wherein Inigo Jones was buried, and which, in 1879, was transferred to the Welsh congregation of London. The *Country Journal* of May 10, 1729, mentions Sheer's old office of Arms as being then "in Dean's-court near Doctors' Commons."

IN the course of next week will be sold for building purposes sixty lots of land, being a portion of Lady Ashburton's estate, latterly a farm, at Addiscombe, Surrey. The farm lands adjoin the former site, now built over, of the grounds of Addiscombe College. Evelyn records in his diary, July 11, 1703, a visit he made here:—

> To see my son-in-law's new house, the outside, to the coveing, being such excellent brickwork bas'd with Portland stone . . . . that I pronounced it in all points of good and solid architecture to be one of the very best gentleman's houses in Surrey.

The son-in-law was William Draper, who had inherited the Addiscombe estate from Sir Purbeck Temple's widow. The architect was, reputedly, Vanbrugh; Thornhill painted the walls and ceiling of the staircase and saloon. Having been occupied by Lord Chancellor Talbot, Lord Grantham, and Charles, first Earl of Liverpool, who died here in 1808, the property was bought by the East India Company, as a training college for their cadets, in 1809, the house we speak of, and with which we were familiar, being converted into the Governor's residence. William Wilkins, R.A., who built Haileybury College, was in 1827 appointed architect to the Company, for whom he designed the cadets' dining-hall, in the Grecian style, at Addiscombe. On the closing of the college thirty-two years ago the estate was sold and its buildings pulled down. Readers of "Vanity Fair" and "The Newcomes" may like to be reminded that Thackeray's step-father, Major Carmichael Smyth, was an officer on the college staff, and that at Addiscombe most of the former's school-holidays were passed.

DEPOSITS FOR SPECIFICATIONS.—A firm of builders send us a printed circular sent to them inviting tenders, with a notice that the specifications can be had on a payment of 2s. 6d., "not returnable," these words being underlined. Although the sum is small, this seems a most undesirable and unfair practice, and it is one calculated to lead those to whom it is addressed to doubt the good faith of the sender. If a deposit is required, it should always be returnable on the receipt of a *bonâ-fide* tender.

THE HYGIENIC CONGRESS AT BUDAPEST.*

IN Section VIII. (Hygiene of Towns), where the Chief Engineer of Budapest, Herr L. Lechner, presided, the most important paper read was upon the "Water Supply of Vienna," by the Chief Engineer of that city, Herr Francz Berger. Formerly—that is, until from fifty to sixty years ago—Vienna depended for its water-supply upon small wells dug in the country surrounding the town, and on house-wells. The first attempt to provide a public supply arose out of the scheme commenced in 1837 for supplying the palace of the Emperor Ferdinand, by an underground aqueduct which, in spite of successive extensions, was not long of great use. Matters remained in this unsatisfactory condition until 1870, when the great Francis Joseph Aqueduct was commenced, which has its source in the Snow Mountains, about 90 kilomètres distant. Even this soon proved totally insufficient, and in 1878 new sources were found in the same mountains, and an auxiliary aqueduct has been built, the necessary works only being completed this year. The city since then can depend upon a minimum supply of about 13,664,000 gallons per day in winter and 23,296,000 gallons in summer. In consequence of the increase in the population through taking into the city the suburbs, this has become too small, and it is calculated that in the year 1900, when the inhabitants are expected to reach 1,673,500, 234,290 cubic mètres will be required, allowing 140 litres (about 28 gallons) per head per day. In 1910, on an estimate of 2,000,000 population, 280,000 cubic mètres will be required daily, and in 1920, with 2,400,000 inhabitants, 336,000 cubic mètres. If two classes of water be supplied, 100 litres daily for culinary and 40 litres daily for other purposes, the capacity of the aqueduct will of course be correspondingly reduced, and if this be done the present sources of supply will suffice till 1920. Of course, the municipal council is already anxiously considering what is to be done. The following are the leading points of the scheme of future extensions: further extensions of the headings in the Schneegebirge (Snow Mountains); new aqueducts from new sources of supply, and schemes for the supply of Danube water for other than culinary purposes. In all directions search is being made, and there are the best reasons to look forward to a favourable result. On all sides the beneficial influence on the public health of bringing water from the mountains was recognised, and by the statistics of mortality, had been abundantly proved.

On the fourth day of the Congress discussions only took place in one or two of the demographic sections, the majority of the Congressists taking part in one or other of a number of excursions, planned for them by their hospitable entertainers, most of the English and American visitors electing to accept the invitation of Count and Countess Esterhazy, at the family seat of Totis, two hours' railway journey from Budapest. The Count, who speaks English like an Englishman, gave a cordial welcome to from two hundred-and-fifty to three hundred visitors, providing delightful drives and promenades in the intervals between the entertainments, at table or in the castle theatre, where a farce was played, evidently got up for the delectation of English visitors.

Work was resumed in all the sections on Friday, the IX. and X. sections being chiefly occupied with the reading of the following papers, and the discussion of the propositions of Professor Corfield and Dr. Pistor, presented at the opening sitting of the section. Mr. Cates was appointed to preside. The first paper read was on the

Sanitary Construction of Dwellings,

by Professor Banister Fletcher, F.R.I.B.A., &c., who commenced by saying that probably no more useful work could be attempted than bringing defects before a large congress, nearly all the members of which were deeply interested in sanitation, as it should surely lead to many experiments being made, and it would stimulate the inventive faculty, so that possibly at the next congress it might be his duty to announce some important improvements. With regard to the first part of the subject—namely, what had been done—he could only, in the limited time at his disposal, give a mere outline sketch. The advancement in "Building" consisted in the fact that they were no longer satisfied with badly-burnt bricks (such as place bricks), which could neither produce good nor sanitary building. They had recognised by law that even if the bricks were

* Concluded from last number.

good, the walls might still be bad, unless the bricks were put together with proper mortar, using a proper proportion of lime to sand, and they now prescribed the character and proportion of the work. For fear of being misunderstood, he desired to remind his hearers that during all periods good work had been done, and that no rules or regulations had been necessary to ensure that. Rules and regulations were only necessary in order to inform the ignorant, and to prevent those who wilfully desired to create buildings in an improper manner. Laws were not necessary for the honest citizen, but to keep in check the wrongdoer. By our various Acts of Parliament they recognised that most necessary precaution, the damp-proof course, preventing the damp from the ground rising up the walls, with all its injury to health. Again, they now prevented flat brick coping from being used, and insisted upon brick on edge work laid in cement, and, as he had already said, such bricks must be of good material.

Again, they had a provision to prevent the damp passing through the face of the wall when the earth was against it. They had also recognised that no site on which buildings were erected could be healthy unless its surface was covered with 6 in. of concrete. Present legislation enforced this requirement, except where the land was gravel, sand, or natural virgin soil, when it might perhaps be omitted. With respect to the finishings, possibly the alteration under section 31 of the London Council (General Powers) Act, 1890, as to the composition of "plastering," was the most important; another question of importance was, why should not all ground floors and basements have skirtings of cement, or some skirting other than wood, and should not all partitions be of brick-nogging, or of some more substantial character than the ordinary quarter partitions?

The most recent legislation which now awaited the Royal assent, was the London Streets and Buildings Bill. This fixes the smallest scantlings of timber, limited heights of buildings, increased yard space, and provided a new angle of limitation. This Act would come into force in January. It would be difficult to estimate the value of its provisions until some legal decisions had been given, deciding exactly what the Courts of Law considered the legislature meant by ventilation. Should not every sleeping-room in newly-constructed houses have some system of ventilation? Should not the ventilation under the lowest floor be more effectively done?

Another point was the pugging of floors. It appeared to him that some regulation was necessary to prevent "dry-rot" occurring, with all its accompanying evils.

In regard to plumbing, water-supply, and disinfectants, much improvement was necessary, and special efforts should be directed to obtain a court of appeal to ensure greater uniformity. For some years almost every Vestry and Local Board of Works insisted upon "wash-out" closets as the most perfect; to-day they were condemned as foul and unhealthy, and thousands on thousands of houses had been fitted with this closet, and of course the owners must bear the expense of altering. He would give one other example, that of the "Intercepting Trap." Some sixteen years ago one of these traps was built in brickwork in cement by a leading sanitary authority, and this very intercepting chamber he proved to be the cause of injury to health. To-day none were so built, for it had been superseded by the forms of materials they all knew, but even with regard to these we had recently had discussions upon their advantages or disadvantages. Another question arose with regard to the size of drain-pipe for an ordinary house? Should it be four inches or should it be six? Surely, if there be a doubt, experiments should be carried out to determine this.

On the subject of water supply he had long held the belief that the water-waste-preventers are a mistake. He knew not if they were in use in Budapest. He would suggest that the old valve closet method of water supply by which you could get any quantity of water by holding down the handle was the proper method. The handle being released, the after flush was given. It was of course unfortunate that the cost of the valve closet is so great, for undoubtedly if well made, it was the best water-closet we had at present.*

With regard to inlet ventilators, of what value were the mica valves? He had seen them again and again so fixed that the valve would not close, and Dr. Sedgwick Saunders was of opinion that where sufficient ventilation existed, the mica-flap was better omitted, it being an impediment to the constant flow of air. With regard to outlet ventilators, the latest experiments gave the curious results that the pipe open at the top acted as well as any of the exhaust ventilators in the market, but we wanted more information on this subject, and experiments should be tried.

Attention should be given to the experiments at Worthing—namely, the use of sea-water for flushing sewers, and this brought before them a much larger question—the supply of sea-water to large towns for bathing. He could scarcely conceive a greater benefit to the inhabitants of large towns than a double supply of water, first, because by having the second supply—viz., salt water, the present sources of supply would remain sufficient probably for all time, and thus the enormous expense of bringing water from fresh and very distant sources would be avoided. As to the sea-water, what a luxury it would be for public baths in towns.

Sanitation could not be confined to houses, and drains for houses might be rendered unhealthy by surrounding causes; thus, for example, the very roadway in front might be insanitary through the influence of wood pavements. Was it possible, whilst retaining the recognised advantages of wood, to invent some composition to impregnate the wood, and so prevent the nuisance?

One advance must be recorded; the examination of sanitary inspectors which Government would in the future require, would commence next year, and doubtless this would place the carrying out of the sanitary requirements upon a better and more uniform and intelligent basis. With all this progress there were serious drawbacks to good sanitary building. There was no one authority dealing with the subject as matters at present stood. Each man was a law unto himself, and vestries and local boards had rules and regulations differing from each other. All who were connected with the building trades knew only too well how curious were the variations—how one kind of closet, pipe, or trap could only be used in one district and not in the others. If an action was brought before the tribunals, no amount of scientific and practical knowledge would suffice to convince one court, while in another it might be readily accepted. What was wanted was some simple permanent Court of Appeal, which should sit whenever cases awaited its decision.

Dwellings for the Working Classes.—In the combined 9th and 10th sections the most important paper left was one by Mr. T. Blashill, (Architect of the London County Council), on "Dwellings Built in Blocks for the Working Classes by the London County Council." After referring to the recent course of legislation on the subject, Mr. Blashill observed that under these Acts it had been the practice of the Metropolitan Board of Works to sell land, when it had been cleared of the old buildings, to societies or individuals, who became bound to erect dwellings to be approved by the Board and the Secretary of State. This method being found very costly, the London County Council determined to keep the land and to pay for the dwellings built upon it. One of their objects was to prevent the serious loss experienced under the former system, but the main object was to keep full control over the erection and management for the benefit of occupiers. The money borrowed for the erection of the dwellings at present built would be paid back in fifty-five years, and they would then belong to the municipality free of encumbrance. He proposed to deal only with the existing mode of carrying out the Act of 1890, and the particular class of dwellings now thought fittest for erection under that Act. Plans were exhibited on the walls of the room in which the section sat, and duplicates were placed in the corridor of the St. Joseph Polytechnic, where a portion of the Exhibition was situated—illustrating the mode of dealing with the "Boundary Street Scheme," occupying an area of 15 acres in the parish of Bethnal Green. The scheme involved the demolition of 728 houses, and the closing and removing of twenty streets; only two churches, three elementary schools, and one large factory being left on their sites. The area has been replanned on the radiating system of streets. From a central circular garden, 270 ft. in diameter, seven avenues, varying from 50 to 70 ft. in width, would radiate, the buildings occupying the intervening sites.*

In designing new dwellings for the poorest class, it had to be remembered that only the minimum amount of accommodation suitable for the residence of a family required to be provided. They must therefore be arranged upon comparatively small areas of ground. The Peabody Trust and the private societies that had been in existence for many years had provided dwellings in high buildings of from five to seven stories in height, and the general experience of these societies was that the rooms at the top let readily at a slightly reduced, or even at the same rent, as the lower stories, and were much approved of by the tenants. Objections had been urged against buildings of six and seven stories by medical officers, and by persons who objected to climbing stairs. The London County Council had, for the present, fixed the height of its buildings at five stories, the higher of any two determining the distance between them. They therefore demanded sites larger than those now generally available. The design of the dwellings for families now approaching completion or being planned for the London County Council was based upon the study of the most successful London buildings of recent date. They were not suggested as models, but as sufficient for families able to pay no higher rent than would provide such accommodation—the estimate assigning two persons to each room.

Self-contained Dwellings consisted of one to four rooms, but very few of the first existed, and it was his opinion that, unless in case of special convenience for their construction, they need not be provided. Families of two could easily find other dwellings, but the chief need was for dwellings of two or three rooms to accommodate families of four and six. Three-roomed dwellings were most needed for families with four children, these having great difficulty in finding accommodation; and, for similar reasons, four-roomed dwellings would be useful; but in the case of the smaller number of families with six children some might be earning wages, and such a family might take a small house.

Certain qualities, varying in different places, should attach to the smallest family dwellings. In London a self-contained dwelling should be entered directly from a wide passage or from the staircase landing, this entrance being, in fact, the outer house-door; the smallest width of stairs and landings being at least 3 ft. 6 in..

The Council demands a height of 8 ft. 6 in. for all habitable rooms; a floor measurement of at least 144 square feet, clear of fireplaces and other solid obstructions; floor surface of at least 96 square feet for every bedroom, a small scullery with sink, copper, and towel-roller attached to each living-room, and beyond the scullery an open lobby, giving access to a w.c., which was thus entirely cut off from the house.

The living-room fittings required a cooking-range, of 2 ft. or a little more in width, with oven and boiler. That used in the Council's dwellings was the Cundy range, having the oven below the fire. Close to the outer wall must be a ventilated food-cupboard, a coal-box and dresser with two drawers, having a pot-board for kitchen utensils under it, and three shelves were placed on the upper part, and a rail held about six coat-hooks. There must also be a cupboard for plates and other non-perishable articles. No fittings were provided in bedrooms, but sometimes a cupboard could easily be added.

On the calculation of two persons to a room, the so-called living-room must be used also as a bedroom, and must therefore be arranged to receive conveniently a bed for two persons, sometimes for the parents, sometimes the children; but sometimes this might be left unoccupied at night. The bedroom doors, probably left open, always communicate with the living-room.

After referring to points of drainage and sanitary appliances, Mr. Blashill said that the London County Council had desired to provide these dwellings at the lowest possible cost, and if possible, at rates within the means of those turned out of unwholesome dwellings. In some cases this object had been attained, in others not. The average earnings of tenants were 21s. per week, about the rate usually earned by messengers, labourers, &c. The average cost of the Council's buildings containing dwellings was £80 per room, considerably more than that of artisans' dwellings built by private societies during several years past. The latter had, however, ceased to build for the present, the cost of building having greatly increased during the past two or three years. The London County Council would expend more than a private society could afford for similar dwellings, being able to borrow money at the very low rate of 3 per cent.

Associated Dwellings.—On consideration of

* We hope the audience did not accept this as representing the views of English sanitarians. A general return to the valve-closet, with its complication of mechanism, its corners for catching soil, and its capacity for improper waste of water, would be a serious step backwards.—ED.

* We have already expressed our strong opinion against this radiating system, which we regard as a complete mistake.—ED.

the whole question it was thought that the Council should, in the future, provide dwellings of a cheaper kind than those it has hitherto built. It would be remembered that the dwellings so far described were "self-contained" or "complete" dwellings, having their own sculleries and water-closets, but others were called "associated" dwellings, in which each separate dwelling would usually consist of a living-room with one bedroom, or with two bedrooms; but probably a few single-room dwellings might be provided, and it might be convenient in special cases to attach three bedrooms to a living-room. In these buildings there would be a common scullery for all dwellings on each floor, in which a sufficient number of sinks could be provided, and from it the water-closets for women and young children would be approached, those for men being provided elsewhere. [All these were shown in the drawings.] Facilities for washing clothes would be provided in connexion with the common sculleries, or in wash-houses built upon the tops of these dwellings, but no decision as to this had been reached, and possibly a central laundry might be built on the Boundary-street site for the use of all the dwellings; in which case no clothes-washing arrangements would be provided in any future dwellings erected on this area.

After these papers had been read, the mention of Dr. Corfield's resolutions (see page 188, *ante*) led to the most animated discussion held in the sections, if not in the whole Congress. On several points the disagreement between the English sanitarians, supported by Dr. Pistor, of Berlin, and a party led by Mons. Bechmann (Paris), Dr. G. von Mayr (Strassburg), and Herr Lindley (Frankfort), was complete. The main points of disagreement were with regard to fixing a minimum width for streets, the building of houses back to back, and the compulsory clause with which the series concluded. The English members were almost unanimously in favour of adopting the principle of the resolutions, but Mr. Arthur Cates opposed the sixth, fixing a minimum width of 12 mètres for all streets, whether new or old; but most of the foreign members went with Dr. von Mayr and M. Bechmann, who formulated an amendment calling for the appointment of a committee to consider the resolutions and report upon them to the next Congress. At one moment the discussion took a heated and almost personal turn, Dr. Corfield declaring that the opposition to No. 6 which denounced "back to back" houses could only arise from ignorance of what was meant by "back to back" houses. In answer to the plea of *non-possumus* advanced by the Strasburg and Frankfort champions (the latter is the son of the English engineer Lindley, who constructed the Hamburgh water-works), he declared that there was no impossibility whatever in the matter. Back-to-back houses, said Dr. Corfield, were universally condemned by all sanitarians who knew what they were, and it was impossible to believe that any member of the Congress would fail to join in that condemnation who had ever seen those abominable constructions. Formerly in Liverpool, there were many thousands of such houses, and at that time the annual death rate of the town was a very high one. But at length they were doomed, and were disappearing by hundreds every year, the death-rate showing a distinct drop after every such disappearance.

M. Bechmann was almost equally emphatic. He said he agreed entirely with all that had fallen from MM. Von Mayr and Lindley, and would say with them that some of the resolutions were too general, and others too precise. The resolution numbered 6 would be inadmissible in Paris, and whatever might be said, it could not be applied generally in London, where many of the streets had houses on each side more lofty than the streets were wide. The resolution forbidding the building of back to back houses would be incomprehensible in Paris, and it could not be adopted. He would prefer the appointment of a committee to further consider the question, because at the present time they were not sufficiently advanced in the discussion of the subject to come to a definite vote upon it. With regard to the disconnecting-trap prescribed in No. 4, which in Paris might perhaps be considered admissible, he did not think it should be pressed against the opinion of Messrs. von Mayr and Lindley, who objected to it. With respect to back-to-back houses, all houses were so constructed in Paris, and they could not construct them otherwise. The representatives of that system, who could only pretend to follow London *longo intervallo* in the path of hygienic progress, could obviously not admit that by a resolution of an International Congress, their whole system should be condemned. In taking that course, he did not think he had merited the epithet, which, if he had properly understood, had been applied to him by Professor Corfield. As it became evident that the amendment would be carried, if the resolutions were pressed, the Professor proposed, with the consent of Dr. Pistor, to withdraw them. The question was now settled so far as the section was concerned, and it was understood that a committee would be appointed to report to the next Congress.

The resolute English professor was, however, not yet at the end of his resources. He had been defeated in the sections, but he might yet succeed in the plenary meeting of the Congress, to take place on the following day. The resolutions were therefore printed with the other resolutions passed by the sections, and perhaps the strife might have been renewed in a concentrated form had the Professor persisted in attempting to carry them.

The last paper read in the united IX. and X. sections was by Herr Ch. Siebreich, architect and civil engineer (Budapest), on "The Minimum Dimensions of Dwelling-houses," which showed that this engineer, one of the original founders of the Hungarian Institute of Engineers and Architects, like so many of his fellow-countrymen who follow the profession, has assimilated from English sources a great deal of sanitary knowledge.

This Institute, of which the Minister of the Interior, M. Charles Hièronymi, himself a civil engineer, is the president, gave a dinner in honour of the Congress, which was attended by most of the English members.

At the concluding meeting of the whole Congress, Professor Corfield read a letter from the Prince of Wales, expressing his interest, and that of the German Emperor, in the beneficent work of the Congress. It was also announced that the next Congress would be held at Madrid in 1897, on the invitation of the Spanish Government. On the testimony of all the delegates who addressed the meeting, the future results of the eighth Congress would be found to be profoundly important.

THE SANITARY CONGRESS AT LIVERPOOL.

THE fourteenth Congress of the Sanitary Institute has proved the most successful of the series. A strong local committee, with the Lord Mayor (Mr. W. B. Bowring), a life-long friend of sanitary science, at its head, was formed many months ago, and it was fortunate enough to enlist the entire sympathy of Principal Rendall, of University College, and of all his professors without exception. The result has been that nearly double the numbers attending the very successful Congress of Portsmouth have enrolled themselves, and the 950 Congressists find themselves very commodiously provided for in the series of spacious halls forming the Liverpool University, as the townsmen like to call it.

The proceedings commenced on Monday with a reception by the Lord Mayor at the Town Hall, a luncheon, and the inaugural meeting convened for three o'clock in the Main Theatre of University College, where the retiring President, Sir Charles Cameron, inducted the President-elect, Sir Francis Sharp Powell, M.P., in the chair.

The new President then delivered his inaugural address.

We give those portions of the address dealing with the branches of sanitary work with which our readers are most concerned. Speaking generally of the present position, Sir F. Powell said, in the opening portion of his address, "It it impossible to survey the field without a sense of satisfaction, almost of triumph. The difficulties which hinder our progress diminish both in area and in gravity. The necessity for devoted attention to conditions favourable to health is felt year by year both more widely and more keenly. No man has the false courage to deny this necessity: few men are unwilling to take some share in our labours or in the cost incurred by the adoption of our policy. There may be reluctance in some districts where the community has outgrown the proportions of a village, but has not attained the dimensions of a town. This intermediate state has been the cause of the greatest anxiety during the whole course of sanitary administration. It is in these communities that hesitation still lingers. It is to them that our persuasive energies must be directed. In large societies the urgency is felt, the machinery is ready at hand, public opinion is more active, the resources are abundant.

Improvement in public health has justified both the cost and the labour expended. Some estimate of the expenditure of capital and the readiness to expend it may be formed from the fact that the Local Government Board has, during the last twenty years, sanctioned a capital expenditure, chiefly for sanitary purposes, of 53,021,334*l.* in urban, and of 3,923,270*l.* in rural districts, while, during the same period, local acts have authorised a further expenditure of 67,335,956*l.* Power to raise other loans for similar purposes has been conceded to other bodies, and to Commissioners holding power for special objects connected with the sanitary progress of the people. Vital statistics abundantly prove the wisdom of such expenditure. With these facts before us we must press forward, jealously maintaining the ground which we have secured and extending the boundaries of our dominion. This Institute may justly claim some part in this work. By meetings, by lectures, by literature, by examinations, we have at once spread knowledge and tested the accuracy of the information obtained by our students."

After treating of the subjects of quarantine, vaccination, adulteration of food, &c., Sir F. Powell said:—

"Passing from this more special enumeration, I must remind the Congress that public health must ever largely depend in great measures on the condition of the house. Rich and poor, urban and rural populations alike, have paid and still pay heavy penalties for errors and neglects. Knowing the course of legislation since the introduction of the Sanitary Act in 1866, I venture to assert with confidence that the duties of the Legislature have been amply fulfilled. Defects and mistakes in the statutes may be pointed out; but, speaking with all due reserve it may be once more stated, without fear of disproof, that administration rather than legislation now demand the energies of the sanitary reformer. Localities, doubtless, have their own special wants; but even those are to a great extent met by the adoptive acts recently passed. Exceptional cases will from time to time require private bill legislation; but even here precedents, almost equivalent to a code, appears now to govern, rightly or wrongly, the proceedings of the Committee of the House of Commons to which such bills are referred. The two London statutes of 1891 and 1894, following similar enactments for the provinces, and some minor enactments, supply for the time, at least, the wants of the Metropolis. The reader of the latter statute will learn with disappointment that domestic buildings in London may still be erected to the height of 80 ft., exclusive of two stories in the roof, power being unfortunately reserved to the London County Council to sanction the construction of buildings even of more gigantic proportions. Air and light cannot perform their life-giving functions at the base of these structures, still less within courts enclosed therein. The lighting and ventilation of such courts is left by the new statute in a less favourable condition than that prescribed by a recent statute for the courts in Glasgow; and the rules as to height of rooms are less satisfactory than those which exist in many provincial towns, or those which are voluntarily adopted by the Peabody trustees. It is not an exaggeration to say that the dwellings of our nation are being built in the course of the present half century. The erection of new houses and the destruction of old are everywhere seen. They are erected under by-laws for the most part wise, and are maintained under regulations conducive to health. Errors of judgment hinder progress. The erection of back-to-back houses, for example, should never be permitted in new streets. Too great haste may defeat excellent intentions. Doubts are already expressed as to the system of huge constructions under the name of Artizans' or Model dwellings. The Mansion House Council, no mean authority, describes certain blocks of artizan's dwellings as a 'difficulty which wants promptly dealing with.' 'These (say their committee) have been erected without any regard to sufficient air and light around them.' They add, let us hope with pardonable impatience rather than mathematical accuracy, 'that these places are haunts of dirt and immorality.'

Be it also remembered that in rebuilding on sites which have been occupied perhaps during many generations by houses in an insanitary condition it will not suffice to clear the ground. The site itself is too often polluted, and must be thoroughly purified by the removal of all noxious matter and other effective measures.

But the most perfect structure must fail when under the control of unworthy tenants. Truth compels those who deal with this subject to con-

fess that widespread neglect or even wilful destruction disgraces the condition of many cottages. The most complete discharge of duty by an owner is of no effect unless the occupant protects and cleanses the property committed to his charge.

Public authorities are helpless without the sanction of public opinion. Such opinion must be created by active agencies, by suasion, by personal visits, not of busybodies, who open more sores than they heal, but by self-denying, persistent, wise, and sympathetic visitation. No paid official can wait and persuade as can the kindly visitor. No summons or order can accomplish what may be done by such intervention. The story of the Manchester and Salford Sanitary Association and of the Mansion House Council is the same. Manchester and Salford are London in this matter, London is Manchester and Salford. Evils beyond the power of description have existed, by slow steps they are diminished or even disappear when encountered by such ministrations. No work was ever more sure of good result. But there must be no relaxation; there must be a ceaseless struggle against the downward current, else we shall float down the stream and lose all the advance so laboriously gained.

In this progress, as elsewhere, we must place confidence in our schools. It is difficult to believe that children who pass long and pleasant hours in cleanly and well-ventilated schools will rest content with dirty and unwholesome dwellings. These little missionaries may prove our best allies, and, by their gentle admonitions and nimble hands, aid in effecting those improvements which will so greatly conduce to their well-being, both in childhood and in later life.

The factory and workshop not less than the dwelling is comprehended within the wide range of our sanitary province. For them each political party shows equal care. The present Home Secretary executes with sympathy and full appreciation the statute passed by his predecessor. The employment, within wise limits, of Female Inspectors, especially as regards work-rooms, will reveal many secrets and effect long-called-for reforms. Increased security against accident, improved appliances for ventilation (none, be it noted, of avail without intelligent co-operation of the workpeople), and general conditions creating greater physical comfort during the hours of labour will increasingly improve the health of the artisan population. Much room remains for such improvement, but he must be a careless observer of the scenes around him who does not observe with gratitude the happy influence of these reforms throughout Lancashire and Yorkshire. Health alone for the moment occupies our thoughts, but it cannot be forgotten that the moral tone of the factory and workroom hands and their mode of life exert influences upon their health not less important than the conditions within the control of public authorities and of Parliament.

It will not suffice to guard the workshop and the dwellings from injurious influences within. The health of the people cannot be sound if the air be polluted. We must doubtless make sacrifices in order to conduct industrial processes. But the magnitude of these sacrifices must be diminished. We know the common saying in reply to a complaint of nuisance arising from smoke, that 'smoke brings money.' There is a new and better adage, 'smoke brings cost.' While more regard for the well-being of the neighbourhood may lessen the nuisance, economy of fuel arising from artificial scarcity may compel the adoption of arrangements which will lessen the discharge of smoke into the atmosphere, both from manufacture and from private dwellings. The working classes, now everywhere endeavouring to raise their condition, may discover that the smoke which renders cleanliness difficult and the brightness of a home impossible, imposes upon them labour which is unnecessary and cost which may well be spared. . . . .

One exception must be made to the statement that improved administration rather than amendment of statutes has for the present the first claim. There is one necessity which presses with such urgency and force as to demand the most prompt and effective action. Long years have passed since the Royal Commission on River Pollution issued their report. Meanwhile the defects of the River Pollution Act have become matters of common knowledge. We cannot hope by one effort in one generation to restore our streams to their original purity. But we can do much. The industrial system of this country has, relatively to the age of our civilisation, continued during but a few years. Those years have been a period of rapid, but not always well-considered or comprehensive extension. The grandfathers of men now active among us were the founders of our manufactures. Let those, who, with infinitely greater advantages, gather the fruits of their toils, remove the evils which have been created during years of immaturity and of haste. The effort is worthy of such labourers as we summon to the task.

Here as elsewhere Local Legislation has led the way. In the year 1892 the Manchester Ship Canal, soon to be supplied with waters from the Irwell, threatened pestilence to widely-populated districts. The Mersey and Irwell Conservancy Rivers Pollution Prevention Bill became law. It is no fault of the joint committee, which is the executive authority under that Act, that Her Majesty when opening the canal was prevented by the condition of its waters from passing more than a few yards along the channel. But this incident, the recurrence of which the energies of that efficient committee will render impossible, is ample demonstration of the magnitude of the mischief. Where the Sovereign was advised not to pass, a large community of her people dwell. What Lancashire and Cheshire has accomplished, the West Riding of Yorkshire, experiencing similar, but not equal, difficulties, has sought to effect. The West Riding Conservancy Act of 1894, following a Provisional Order Act of a former year will bring under control rivers and streams which are now dangerous to public health and a disgrace to our manufactures. Some details of administration in the Bill as finally passed are, in my judgment, less effective than corresponding details in the Mersey and Irwell Act. But the modifications may remove friction and may thus, although less satisfactory in form, prove not less effective in administration. They may also assist the County Councils' Association when considering the new print of the River Pollution Bill, which will be introduced in the next Session. The Bill has been twice submitted to the House of Commons, but its further progress was prevented by the unfortunate condition of our proceedings, which permits any one member by one scarcely articulate expression to prevent the most valuable legislatiou. I am not without hopes that Government will grant an inquiry by a Select Committee. Those who feel difficulties would thus have every opportunity of stating them, and Parliament would be better prepared to decide as to the concessions which ought to be made to the exigences of manufactures and the susceptibilities of some municipal authorities. The Government of the day may then undertake a task which appears for the moment, and in the present condition of our procedure, to exceed the opportunities of non-official members.

The Thames Conservancy Act of 1894 is another step in advance. One strange concession to a steam navigation company supported, as we may assume, by sufficient evidence is, to my thinking, a blemish to the Act, but as a whole the legislation respecting the Thames is worthy of the occasion. Sewage or any other offensive or injurious matter is not to pass into the Thames or any tributary through any sewer-pipe or channel, not at the passing of the Act lawfully used for that purpose. Even in such cases the Conservancy are directed to give notice to the person causing or suffering the flow or passage of such offensive matter to discontinue the same within three months, power being given to extend the term to meet exceptional cases. An appeal is given to the Board of Trade, which is without any officers trained to decide such a question, instead of to the Local Government Board, which commands the willing services of a highly qualified scientific staff. Such eccentricities of Legislation are, however, but too familiar to us, and, though deeply to be regretted, are condoned by those who know the difficulties of effecting any reasonable reform by Private Bill, or, indeed, by any other method of legislation.

In the above remarks I have entered upon no descriptive details. They are but too-well known. Would that any words from me as occupant of this Presidential chair could induce men in responsible positions to give us, in these our efforts, the weight of their high authority and their great influence. To any lover of his kind it is melancholy to dwell on the scenes presented on many river banks and in the streams themselves. We desire the advance of our people in health, in culture, in sense of beauty. Such advance is impossible when they live amid such surroundings. Let reform be made quickly and effectively. The time for reform has come. Any unnecessary delay in a question of such moment cannot justly escape censure or even severe condemnation. . . . .

There is, without question, ample opportunity for valuable discussion with a view to possible amendment on the law on what may be described as collateral subjects, not ordinarily included within the category of laws affecting public health. . . . . The occupants of common lodging-houses, the humblest of our population, require further protection during their sojourn in such dwellings. Much remains to be done before our slaughter-houses and arrangements connected therewith are wholly satisfactory. Although the increasing wants of London have been in some degree met by the East London Water Act of last Session, the exhaustive Report of the Royal Commission on the Metropolitan Water Supply claims the fullest consideration from those who have responsibilities within the Metropolitan area. This necessity arises not only from difficulties connected with supply of water, but also from the mischief caused by the diminished flow in the Thames. . . .

Let us wait no longer for new laws, but put into effect the laws already on the Statute Book. There may be some return of population to rural districts, but a vast proportion of our inhabitants must continue, and probably in growing proportions, to dwell in urban districts. This tendency appears to prevail throughout all civilised countries. A German writer cited by the Reporter for the Labour Commission remarks that "It is a phenomenon of annual recurrence that the harvest cannot be got in at the right time. In some districts the supply of labour is insufficient even in the winter. The physical and moral health of our nation, as well as its military strength, suffer the most grievous injury from over-rapid pressing into city and factory life and from trans-oceanic emigration." We must therefore with all zeal bestow energy and knowledge on the improvement of our towns. To the attractions already dominant let there be added those of health, and even of ornament. Already the records of death prove that the proportion of deaths in many towns does not differ as widely as of old from the proportion in rural districts. Let that difference lessen to the vanishing-point. Towns have at their command efficient drainage, ample supply of water, prompt removal of refuse. They are acquiring by slow but sure degrees arrangements of their dwellings favourable to health. To the spacious parks, so civilising in their effects, must be added the open spaces protected from all cause of annoyance, where the toiler may seek repose near his dwelling among pleasant surroundings during the intervals of his labour. Lord Meath's Public Garden Association can now claim between one and two thousand acres of open spaces as the result of their efforts within the Metropolis. What has been done in London must be possible elsewhere.

The baths and wash-houses, no longer so far removed from the dwelling as to be of little avail to the workman in his comparatively distant home, will throw out branch establishments for himself and his family within reach of his dwelling. The gas-engine and the mysterious agency of electricity, giving motion, heat and light, will remove many debilitating and uncivilising influences. The desire for a higher life, now so salutary, acting through an intelligent public opinion, will accomplish these beneficial reforms; and our towns retaining all their colossal grandeur and their power, will be the scenes of ever-increasing refinement. I know well—no man can know better than myself—the disappointments, the mortifications, the fatal illustrations of the weaknesses, incident to our nature, which will impede our course; but the duty remains the same. Progress, already made, gives confidence for the future. I, speaking for myself, am full of hopes. Those hopes will be in a large measure fulfilled if the advance of the next half-century is equal to that made in the fifty years now counted among the past. I see on every side reasons for encouragement, none for holding back. There is everywhere fuller knowledge, riper experience, more sympathy from public opinion. Let us all press on in our great task, each a thoughtful and active worker in his own province. Our reward will be seen in every home which we purify, every family which we strengthen, every population which we elevate. None can foresee what struggles are at hand, what rude encounters are near, what severe competitions are to be met. It is our endeavour and our duty to prepare our nation for every trial, to give strength to bear hardship, vigour to conduct the contest, endurance to persist until the victory is gained."

After the usual thanks had been accorded, more than 200 members of the Congress, delegated by County Councils, City, Borough, and Urban Authorities and Societies in every part of the

United Kingdom were presented to the new President.

The proceedings of the opening day were completed by the formal opening by the Lord Mayor and the Lady Mayoress of an extensive Health Exhibition occupying the large Drill Hall of the 2nd Volunteer Battalion Lancashire Regiment. After a promenade of the chief guests through the Exhibition, Dr. Wynter Blyth, chairman of the committee of judges, announced the awards of medals and certificates, and made a report which compared very favourably with the most successful of the thirteen previous exhibitions.

Medals were awarded for disinfectants to Boake, Roberts, & Co., Stratford, for Liquid Sulphur Dioxide; F. C. Calvert & Co., Manchester, Pure Carbolic Acid; certificates to Jeyes' Sanitary Compounds Co. for Fluid Coal Tar Disinfectant; Newton Chambers, & Co., Thorncliffe, for Izal Disinfecting Fluid. Earthenware Appliances—Messrs. J. Cliff & Sons, Wortley, two medals for Cecil Porcelain Sink and Imperial Porcelain Slop Bath; Doulton & Co., for Metallo-Keramic Joint for connecting lead to earthenware. Certificates were given to J. Cliff & Son for Porcelain Kitchen and Scullery Sinks; to Doulton & Co., for Glazed Fireplaces; and to Thos. W. Twyford, Cliff Vale, for Combined Lavatory Basin.

CONFERENCES.

The second day of the Congress was devoted to conferences in five sections devoted to different groups of subjects. They occupied separate lecture theatres under the following Presidents:—Municipal and County Engineers—Mr. A. M. Fowler, C.E.; Sanitation of the Mercantile Marine Service—Sir W. B. Forwood; Medical Officers of Health—Dr. Charles E. Paget; Sanitary Inspectors—Dr. Francis Vacher; Domestic Hygiene (Ladies' Conference)—The Lady Mayoress (Mrs. W. B. Bowring).

CONFERENCE OF MUNICIPAL AND COUNTY ENGINEERS.

Mr. A. M. Fowler, C.E., took the chair in this, one of the most numerously-attended of the five conferences, in the Engineering Theatre of University College precisely at 10.30, and delivered an address of which the following are the chief points. Among the questions of the day demanding the most serious consideration from sanitarians were the three following:—

1. The improvement in the condition of the dwellings of the working classes, and the development of facilities to meet this end.

2. The improvement in the surfaces of the streets and ground in our midst.

3. The water supply for domestic use.

"With regard to the first of these essentials," said Mr. Fowler, "I am of opinion it is futile to endeavour to gain—or, shall I say mature—a condition of hygiene in the absence of satisfactory dwellings being provided for the poor; for it is here where the initial stage of contagious diseases invariably germinates. The question of housing the poor, we all know, has been discussed from time to time during the past eighteen years, and hundreds of thousands of pounds have been expended on what has been called the improved system of building blocks of artisans' dwellings, and I am free to admit that it is an improvement on the former state of things; but on the other hand it is (in my opinion) as yet far from satisfactory. Some of these blocks stack (so to speak) together as many as 1,000 individuals under one roof during the night. It is true a thorough ventilation is obtained in the daytime; but this is not secured during the night. To house the poor in such heaps is not the best way of meeting the difficulty; inasmuch as the rents are excessive and there is no chance of the tenant becoming the owner of his home, the number of people per square year of land is excessive. The crowding together of so many under one roof tends to the absence of independence and has a demoralising effect. And, again, the houses erected after the Local Government Model Bye-Laws—demanding a thorough passage and ventilation, with ground space at the back or side—have a tendency to create much self-sacrificing on the part of the tenant, inasmuch as the rooms have often to be let off to lodgers owing to the necessary high rents; whilst the back-yard premises often become occupied with poultry and an accumulation of rubbish, resulting in filth. I have therefore come to the conclusion that the back-to-back house self-contained (as so extensively constructed at Leeds on the modern plan) is the best class of house for the working man,* for the following reasons:—

There is as a rule 4 square yards for each person under one roof, and nearly 11¾ square yards of appropriated land area (to centre of streets) as compared with the excessive number of persons per square yard under one roof in artisans' dwellings.

These cottages are built in blocks of eight—four back-to-back, with a twelve yards street in front, with a space of 15 ft. at the end, or between each block. The streets are well paved, and the interstices of the stones are filled in with asphalte run in hot, and the footpaths flagged. The land upon which the houses are built is freehold, and invariably the tenant is the owner. These cottages are the most cleanly of any such dwellings in large towns. The outcome of all this is that the working classes are settled, and nearly three-quarters of the householders are owners (through Building Societies) of the houses in which they live. As an instance of self-reliance, a workingman in Leeds pays 3s. or 4s. per week, including interest, until the principal and interest amounts to 40*l.* or 50*l.* He then withdraws and purchases a house for say 160*l.*, borrowing the difference, viz., 120*l.*, from the Society. But he has to pay 3s. per week to the society for twenty years more when his house becomes his own; otherwise he would have to pay *as tenant* to a landlord 4s. 3d. per week, and the house would not be, of course, his own. Thousands of houses have been built in this way, and there is no part, so built, overcrowded. Compare this with, say the Victoria Square block for example, where a three-roomed house is charged 5s. 6d. down to one room 2s. per week, and no chance of the tenant becoming the owner, the death-rate when deaths in hospitals are taken into account in connexion therewith is upwards of 16 per 1,000. The true artisan has a horror of dependence, as all true Britons have; therefore an effect of patronising should be sought to be avoided by giving him a chance of self-reliance, control, and independence, and ensuring him (as I have shown) of having the profits of his own savings.

The Royal Commission's Report of 1884 condemned the leaseholders' system as detrimental to the health and prosperity of the working classes. The Report says:—

"Evidence has also been given as to the system of the middlemen, of house jobbers, house farmers, or house-knackers; for by all these titles are designated those persons who stand between the freeholder and the occupier, and who fix and receive the rent of tenants' houses. The covenants to repair, cleanse, paint, and keep the drains in order are attended with an indisposition to enforce the troublesome and costly process. The system of building on leasehold land is a great cause of the many evils connected with overcrowding, unsanitary buildings, and excessive rents. This appears to be conclusively proved by the evidence of Lord Wm. Compton, Mr. Boodle, (the agent of the Marquis of Northampton), Mr. Vivian, of Cranbourne, and others."

Forty years ago, continued the President, the death-rate of Leeds was 40 per 1000, now it ranks with the healthiest of the manufacturing towns of the kingdom.

With regard to the construction and maintenance in a sanitary condition of the streets and roads of large towns the President said the enormous saving by improved roads could not be over-estimated, but as the benefits cannot be clearly shown on the books of a Corporation, the cost of hardwood pavements, or nearly noiseless asphalte, with the constant removal of filth, was apt to be regarded as extravagant. There could be no doubt that the floating particles in the atmosphere creates lung diseases, as in manufactories where the dust of coal, sand, steel, cotton, and hemp, also from stone quarries where the workmen suffer by inhalation. But the suspended matters in the air in large towns chiefly consist of dust from refuse and organic matter, and imperfectly consumed particles of coal.

The reduction of dust and dirt must conduce to the health of the people—must reduce the death-rate, which meant economy. The saving of life in Leeds alone, taking Dr. Farr's estimate of 159*l.* per head as the average, was 82,229*l.* a year as compared with twenty years ago. The plan adopted in Manchester in laying wood pavements was well calculated to minimise the accumulations of dirt in the streets. The joints of the pavement were filled in with asphalte and tar.

The benefits accruing to large towns from a supply of soft water were also of great importance. Hard water involved the use of a considerable amount of soda, and sometimes lime, which is destructive to linen and all washing garments.

A saving of at least one-half might have been effected by using soft water.

The purification of sewage had excited a great deal of discussion, and many competing schemes were before the public for realising that object, but the cost of carrying them out made most of these schemes impracticable. The filtration of sewage, either through artificial filter-beds or through land, appeared to offer the best prospect of success. This plan was carried out at Antwerp, where, in 1885, filter-beds had been constructed which were composed of spongey iron and sand, and everything went on well and in perfect order, and good results obtained until the scheme had been working some eighteen months, and, most singular to say, that after this period it was found that the soft nature of the water of the river Neath, into which the sewage, from a population of 97,000 from three towns, flows, before it was pumped, softened, and dissolved the iron to some extent, and it was found that a thin film of carbonate of lime formed beneath the surface of the filter-beds, with the result that the application of spongey iron has now to be applied by means of revolving filters.

Thus even this scheme, which had succeeded, had to be reconstructed before giving good results, the inference from which was that all schemes for purifying sewage by artificial means must be looked upon with caution. The effect of filtration was to destroy the bacteria.

In conclusion the President said the subject that has been specially selected for consideration at the Conference was the Construction of Refuse Destructors. Certain papers would be read describing various systems in use, some of them by the inventors of the apparatus; but it must, of course, be clearly understood that the selection did not in any way imply the approval of the Congress with regard to any of the apparatus described.

Illustrations.

MARBLE STAIRCASE, GLASGOW MUNICIPAL BUILDINGS.

THERE are two principal staircases in the Municipal Buildings, entering from opposite sides of the Loggia, but on the Council Hall floor they are connected, and form a vista of marble walls and arches 180 ft. in length.

Our illustration, taken from the architect's (Mr. Wm. Young) Royal Academy drawing, gives a view of the staircase leading to the banquetting-hall and salons.

The design is a piece of pure masonic construction, ornamentation and carving being avoided, so as to give full value to the rich marbles which were selected to produce decorative effects.

The panels in the lower part of the walls are of selected alabaster, to give the suggestion of pictures, and the effect of seascape, mountain and cloud forms shown on the drawing is copied from the executed work.

The upper part of the walls, showing behind the arches, is of dark alabaster, forming a frieze above the lighter marble and alabaster walls below it.

The panelling of the walls is of alabaster, with mouldings and margins of dark and light marbles. The columns are Brescia and alabaster. The floor is of Numidian and black marbles. The steps are solid veined marble, the balusters alabaster, and the capping and base veined marble.

W. Y.

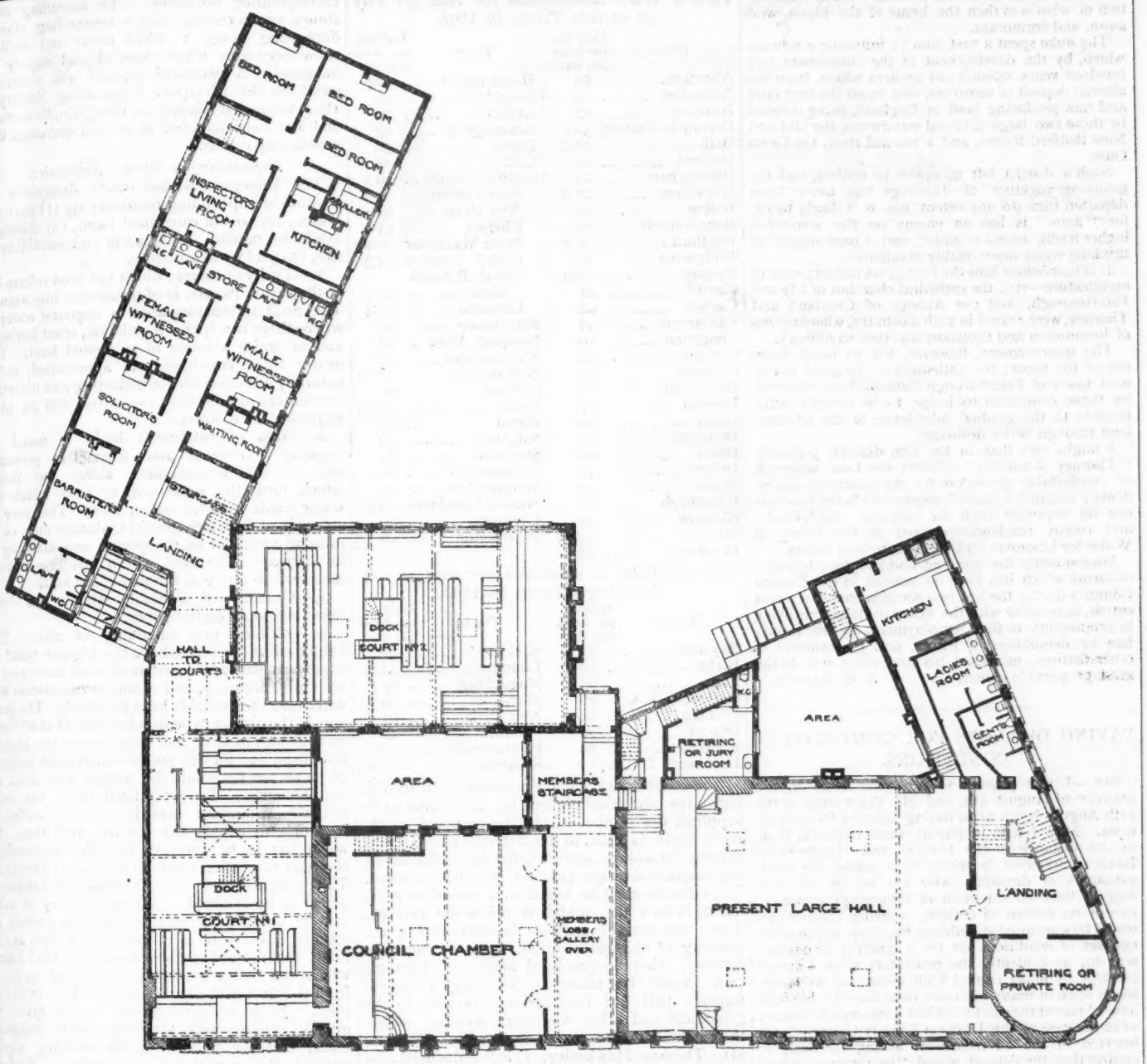
HOUSE AT HAMBLE.

THIS house is now being built at Hamble for the Hon. Alick Yorke.

The plan and general design are based on a house already built at Northwood, four rooms and a servants' staircase being added. The walls are faced with red bricks, and the roofs are tiled. The whole of the woodwork will be painted white except the shutters and windows and the entrance doors, which will be painted bright green.

The general contractors for the work were Messrs. Green & Abbott, of London, and the contract price was 1,300*l.*

* We duly report this remarkable recommendation, hoping, however, that some at least of Mr. Fowler's audience knew better than to believe such nonsense. That the self-contained house is better for the working man, where it can be had, than the block of "model dwellings," we fully agree; but that back-to-back houses should be at this day seriously recommended at a so-called Sanitary Congress is too absurd.—ED.



Municipal Buildings, Rotherham.—First Floor Plan.

ADDITIONS TO TONBRIDGE SCHOOLS.

THE only portion of the original fabric of the Grammer School at Tonbridge, founded by Sir Andrew Judde, Kt., in the year 1553, is now incorporated in the head-master's house. The old school-buildings were taken down and the new erected in the present position in 1863, by the Skinners' Company, who are the Governors of the school.

Science laboratories, Art rooms, and library, were built in the year 1886, at the north end of the school-grounds, and so placed that a future extension of the building would connect the two. Such extension has lately become necessary owing to the rapid increase in the numbers of the school under the able head-mastership of the Rev. Joseph Wood, D.D. The large school of 1863 being totally inadequate for the accommodation of boys and visitors on speech day and other occasions, it was determined to build a new one capable of seating over 500 persons. The illustration shows the external view from the playground. The interior has a massive hammer-beam roof in oak, and a panelled oak dado on all sides 9 ft. high. A large platform for use on "Skinner's Day," and two small retiring rooms are provided, and a large recess is also arranged for as an organ chamber. The new block of buildings connecting the existing portions above mentioned, contains six class-rooms, each 24 ft. by 20 ft., and two science laboratories, 40 ft. by 20 ft. The basement will be used as wood and metal workshops, and the top floor as studies, porters' rooms, &c. A new masters' common room, 26 ft. by 24 ft., is also provided in the large tower, which forms the central feature in the façade with a dormitory over, and music and practising rooms on the top floor.

The whole of the elevations are faced with the local Southborough stone, and the design has been carried out in the spirit of Late Gothic work, harmonising as far as has been thought expedient with the building of 1863.

The cost of the present buildings, together with the alteration of levels to playgrounds, &c., will be about 23,000*l.* Mr. Campbell Jones, Surveyor to the Company, is the architect. Messrs. Strange & Son, of Tonbridge Wells, are the general contractors, and Mr. W. H. Ferguson is the clerk of works.

The new buildings are approaching completion, and will be formally opened next month.

MUNICIPAL BUILDINGS, ROTHERHAM, YORKS.

THIS is a reproduction of a perspective drawing of these buildings which was exhibited in the Royal Academy this year. The present buildings of the Corporation have been partially utilised, and the parts of the old buildings remaining are indicated by hatched lines on the plan.

All the police offices, cells, courts, &c., on the ground floor, are new, and the fittings have received special attention so as to make the buildings as complete as is possible.

The entire elevation to the right from the entrance is new, together with the tower, pediment, cornice, &c., and the whole of the first floor, except the five circular-headed windows on the left.

The entire arrangement of the ground floor is also new, and all the first floor and other parts with the exception of the large hall and roof over.

RICHARD J. LOVELL.

COMPETITIONS.

NEW PARK, BRISTOL. — Mr. Thomas H. Mawson, architect, of Belle Vue Park, Newport (Mon.), has been awarded the first premium in open competition for designs for laying out a new public park for St. George's, Bristol.

Correspondence.

To the Editor of THE BUILDER.

HOUSING OF THE AGRICULTURAL LABOURER:—THE FEN DISTRICT.

SIR,—Your commentary upon the Report of the Royal Commission *re* the above subject in the current issue is both valuable and instructive.

I should like, if you will permit me, to supplement it by adducing some cogent reasons accounting for the usually remote situation of the abode of the agricultural labourer in the district known as "The Fens" from the locality of his employment.

The district alluded to is unique in England; it has no correspondence in any similar area approaching equal extent elsewhere in the country. It may be described as a tract of country extending from Bedfordshire in the south to the south-west portion of Norfolk, westward of the River Ouse in that county, and terminating at "The Wash."

Until early in the seventeenth century this was, for the most part, a huge morass, and undoubtedly looked upon as an irreclaimable bog, with here and there a small area above flood level, upon which the natives built their thatched dwellings. In the year 1625 the then Duke of Bedford called in Vermuyden, a Dutch engineer of eminence, who had had experience in dealing with similar "swampy areas" in

Holland, and he devised a scheme for the reclamation of what was then the home of the heron, wild swan, and cormorant.

The duke spent a vast sum in initiating a scheme which, by the development of the subsequent two hundred years, opened out an area which, from the alluvial deposit of centuries, now forms the best corn and root-producing land in England, being drained by those two large artificial waterways, the Old and New Bedford Rivers, and a natural river, the Great Ouse.

Such a district left no option to settlers, and the grouping together of dwellings has never been departed from to any extent, nor is it likely to be, for "ague" is less an enemy on the somewhat higher levels, access is easier, and a pure supply of drinking-water more readily obtainable.

It is marvellous how the four great masterpieces of architecture—viz., the cathedral churches of Ely and Peterborough, and the Abbeys of Croyland and Thorney, were reared in such a country, where means of locomotion and transport was then so difficult.

The improvement, however, left its mark upon one of the fanes; the settlement of the great north-west tower of Peterborough Cathedral was deemed, by those competent to judge, to be directly attributable to the gradual subsidence of the adjacent land through better drainage.

I might add that, in the Fen district, probably "Thorney Lordship" exhibits the best specimen of comfortable provision for its labouring dependents; and in "upland" country no better example can be advanced than the excellent, comfortable, and roomy residences erected by the Prince of Wales for labourers on the Sandringham Estate.

Undoubtedly the merging and grouping together of farms which has been so general in the Eastern Counties during the last two decades has, to a great extent, done away with the system of labourers living in propinquity to their employment, and the farmer has by demolition of fences, and the removal of other features, increased his producing area to the greatest possible extent,

S. S. SAINTY.

PAYING DEPOSITS FOR COMPETITION CONDITIONS.

SIR,—I was pleased to see your Note in the *Builder* of August 4th, and Mr. Pite's letter in the 11th August issue, as to paying deposits for instructions. May I ask, in paying these deposits, if, as in the instance of the Halifax and Huddersfield Bank competition, in which it is stated the bank managers or directors (who are to be the sole judges) have no intention of returning the money, except on receipt of designs, whether competitors would be warranted in clubbing together, and making one set of conditions do for a quantity of designs sent in, as evidently the promoters show a covert attempt to make capital from those who lay themselves open in many instances to be duped? I should have obtained the conditions had a reasonable clause, as in the case of the Durham County Council, been inserted in the advertisement asking for designs, stating that the deposit would "be returned either on receipt of a design, or return of documents within fourteen days."

A NON-COMPETITOR.

*** Of course competitors who are known to each other can do as our corrrespondent suggests, and share a copy of the "conditions" among them, but they would find it very inconvenient.—ED.

The Student's Column.

DETAILS OF RURAL WATER SUPPLY.—XIII.

STORAGE OF WATER.

ONE of the most important questions for the water engineer is the determination of the capacity for storage which is to be provided in the impounding reservoir. The purpose of these reservoirs is to maintain a balance between the fluctuations of supply and demand when the rate of consumption is greater than the natural supply at the same period. They should not be too large or expensive, keeping in view the average growing necessities of the population. The average quantity of water required per head of population per day varies according to circumstances. It is generally supposed that it should not exceed twenty gallons in non-manufacturing, and thirty gallons in manufacturing, towns; though in, fact, these quantities ought to be, and will soon be, regarded as minimum rather than maximum limits. The following table gives the variation in the quantity used in fifty-eight towns in the United Kingdom and in fourteen towns abroad. The comparison is not altogether satisfactory, as many of the towns abroad include water used for flushing purposes in the rate consumed per head:—

Table of Water Consumption per Head per Day in various Towns in 1892.

TOWN.	Gallons, per head per day.	TOWN.	Gallons per head per day
Aberdeen	60	Huddersfield	22½
Abingdon	5	Keighley	30
Banbury	17	Lanark	40
Barrow-in-Furness	32·8	Leamington	17
Bath	21·5	Leeds	30
Bedford	25	Lincoln	21
Birmingham	23	London County	29·5
Blackburn	27·2	East London	31·8
Bolton	20	New River	28·5
Bournemouth	25	Chelsea	34·6
Bradford	22·7	West Middlesex	29·2
Bridgwater	16	Grand Junction	33·3
Burnley	22·09	Vauxhall, Southwark	31·2
Cardiff	21	Lambeth	30·4
Carlisle	22	Manchester	21
Carnarvon	40	Newport, Mon.	20
Congleton	10	Northampton	14
Coventry	20	Nottingham	18·73
Croydon	32	Oldham	20
Dartmouth	12	Perth	39·39
Darwen	27	Ripon	23
Derby	20	Salisbury	40
Doncaster	20	Sheffield	21
Dover	26	Southampton	30
Dublin	47	Staleybridge	21
Dundee	50	Stratford-on-Avon	19·5
Edinburgh	40	Ulverston	40
Glasgow	50	Warrington	20
Halifax	23·75		
Hereford	30		

Table of Water Consumption per head per day in Foreign Towns in 1892.

TOWN.	Gallons per head per day.	TOWN.	Gallons per head per day.
Bayonne	55	Kiel	28
Berlin	22·9	Limoges	52·8
Bonn	63	Magdeburg	29·7
Boston, U.S.A.	76	Marseilles	99
Chicago	95	New York	65
Detroit	126	Paris	47
Frankfort	39	Philadelphia	56
Hamburg	52	Stuttgart	23·8

The consumption having been estimated according to the circumstances existing in the area to be supplied, the rainfall within the proposed catchment basin is then to be determined. In estimating the storage required, the data afforded by any single or average year will not be sufficient. The estimate must be based on a period of years during which the rainfall is below the average. There are several methods for determining the capacity of storage required, some by empirical formulæ, others by graphical methods. Extreme care should be taken in adopting empirical formulæ that due consideration is paid to the geological and other conditions existing within the catchment area to be dealt with. The late Mr. Thomas Hawkesley, F.R.S., deduced the following formula based upon his extensive experience:—

$$z = \sqrt{\frac{1000}{r}}$$

Where z = the number of days' storage required (which varies from 100 to 250 days).

" r = average rainfall in inches during three consecutive dry years, the average rainfall for a dry year being taken at five-sixths of that for an average rainfall of a long series of years.

A solution of this question by graphical methods was communicated to the Institution of Civil Engineers in 1883, and a further paper was recently read before the Austrian Society of Civil Engineers by the same writer, Herr W. Kippl, of which the following is a description:—

On an axis of abscissæ, the months are laid off for each year of the period under consideration, and the demand of the town in cubic feet or gallons for each month plotted as ordinates, a slightly undulating curve drawn through the points so plotted gives the demand curve. In a similar way the supply curve is plotted, and represents the available rainfall from the watershed. Whenever the supply curve rises above the demand curve, we have a surplus on hand, and when the latter curve rises above the former a deficiency is shown for the period indicated. From such a diagram the surplus or deficiency for each month can be scaled off and used in the construction of a mass curve. The months and years of the period involved are represented abscissae as before; but the ordinate at each month represents the algebraic sum of all the surpluses and deficiences from the beginning of the period to that point. The mass curve reveals the surplus or deficiency during the interval between any two points on the axis of abscissæ, which is represented by the difference of the corresponding ordinates. An ascending curve shows an increasing, and a descending curve a decreasing storage; whiie crests and hollows show occasions when demand and supply are balanced. A graphical method was communicated to the Liverpool Engineering Society in 1891, somewhat similar to Herr Kippl's method, and has been adopted in several instances with satisfactory results.

Impounding or Storage Reservoirs.

The principal factors which determine the position of impounding reservoirs are (1) purity of source, (2) area of catchment basin, (3) quality of available rainfall, (4) altitude and suitability of site, (5) geological structure.

1.—Purity of source, which has been referred to in the earlier papers, is of paramount importance. The most satisfactory area to impound water is where there is a sparse population, scant herbage, and an entire absence of cultivated land. The nearer these conditions are approached, either naturally or artificially, by collecting and diverting the sources of pollution, the nearer will an ideal watershed be realised.

2.—Area of catchment basin is found by drawing a contour line from the proposed site of the embankment along the ridges which form the watershed, or from which the water sheds itself on either side. This may be ascertained from a contoured Ordnance map, or by running a contour on the ground and marking it on the map. The land within this line is then measured to arrive at the superficial area.

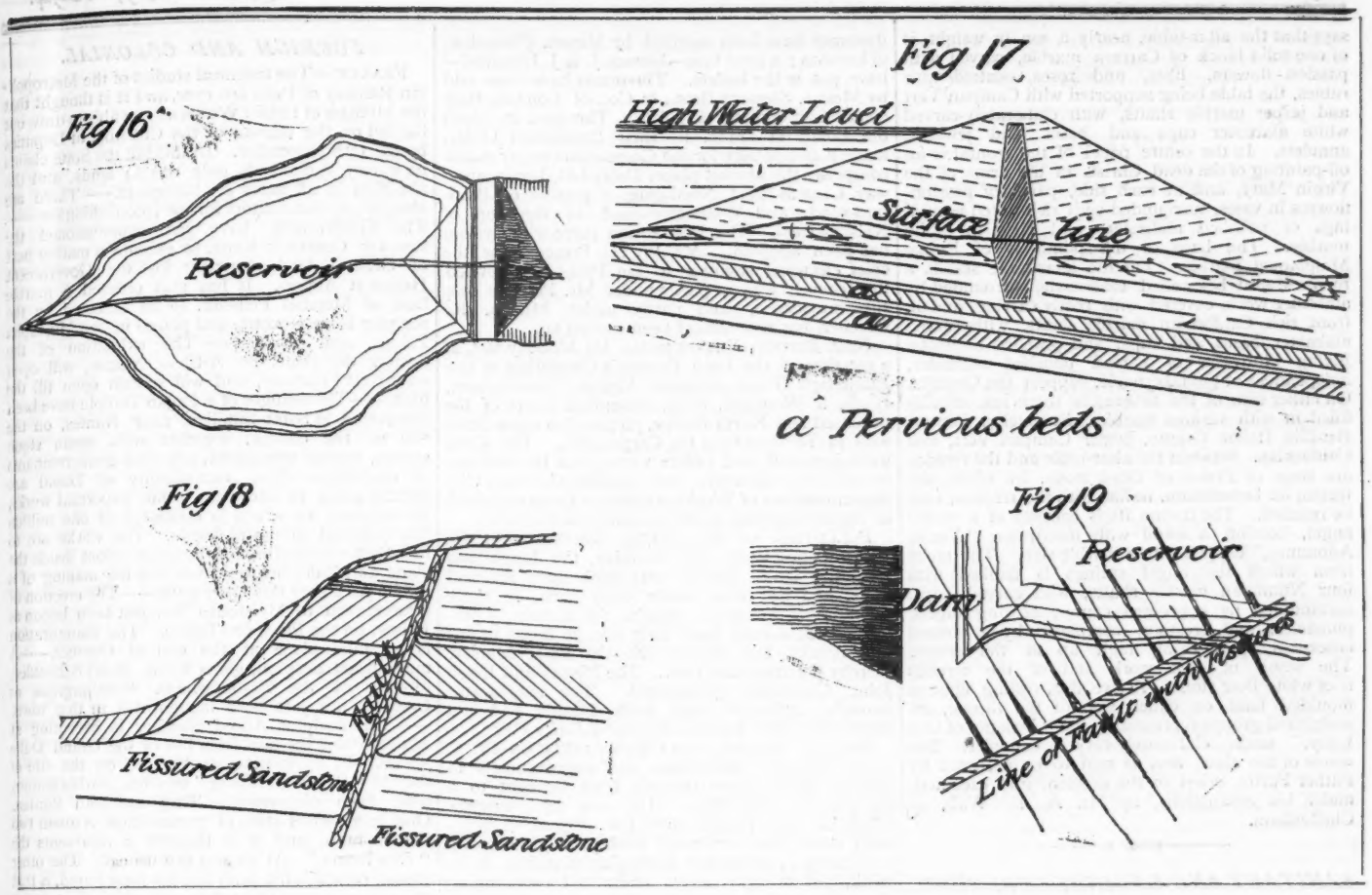
3.—Quantity of available rainfall has been described in an earlier paper.

4.—Altitude and suitability of site. The height of the source above the highest point of supply can easily be ascertained by an inspection of an Ordnance map, and a simple calculation will determine the available head for supply. The pressure in the district to be supplied should at all times be sufficient to force the water above the highest buildings, and for this purpose an average pressure of 80 to 100 ft. would be ample, and meet all requirements. In exceptional cases the only available catchment area is not at a sufficient elevation to supply the district, and then the water has to be pumped from the impounding reservoir to another reservoir at a higher elevation. The greatest capacity with the least cost is the next object to be attained. Where a valley or lake can be utilised the most economical method of forming a reservoir is to construct a dam at the inlet, the most desirable shape (fig. 16A) being where the valley gradually widens out upwards from the dam with only a slight fall to it from the inlet. Such an arrangement would give the greatest capacity with the least cost for embankment, and the uniform depth resulting would prevent the growth of vegetation. Surface springs should be kept clear of the embankment on the inner side if possible, or conveyed outside the reservoir. The materials of which the dam is to be formed will depend upon those which are available on the site of the dam, and will be dealt with in detail subsequently.

5. Geological structure of the area proposed to be utilised for the formation of an impounding reservoir should be exceedingly carefully examined. Too much stress cannot be placed upon a thoroughly practical examination by an expert geologist or engineer who has a practical knowledge of the subject, as a want of sufficient care at the outset may result in a largely-increased cost of construction, or even a subsequent abandonment of the site. The site of the Woodhead Reservoir of the Manchester Corporation had to be abandoned on account of the unsatisfactory foundations revealed after the excavations had commenced. The presence of permeable rocks dipping towards the dam is a source of trouble, and every precaution should be taken to prevent the water from percolating into them. The best method is to excavate to a sufficient depth along the outcrop, and afterwards to fill in the trench with puddle protected on the surface with concrete. The permeable strata should also be cut through by the puddle trench of the dam, or the water in the reservoir will gradually escape and rise as springs at a lower point in the valley, the quantity varying with the head of water in the reservoir (fig. 17). Mr. Isaac Roberts, F.G.S., records the following observations upon the effect of pressure on the quantity of water that will pass through a square foot of sandstone of average coarseness, 10½ in. in thickness:—

Pressure.	Percolation.
10 lbs. per square inch =	4½ gallons.
20 " " " =	7½ "
46 " " " =	19 "

The dislocations produced by faults, and the



fissures proceeding from them, are also a fruitful source of anxiety. A knowledge of their positions can only be ascertained by trial pits systematically arranged; boreholes should not be relied upon. The fault may be practically an open fissure, as well as a dislocation of the strata, raising a permeable bed to or near the level of an impervious one (fig. 18). The fissures extending on either side are even more difficult to deal with than the fault itself (fig. 19); they frequently occur in the older rocks. The result of such fissures is to convey the water out of the reservoir either by the side of the dam or under it through permeable strata, where it may rise as springs. This entails a serious loss to the impounding works. In exceptional cases the matrix or material between the two cheeks of the fault is composed of fine silicious clay, which forms an effective dam in itself. As an instance of serious results arising from a fissured foundation, where due precautions have not been taken, we may refer to the Holmfirth reservoir, which burst in 1852, on the only occasion on which it was filled. The embankment was constructed on fissured sandstone, and the water gradually escaped through the fissures, washing a portion of the embankment with it. Ultimately the embankment subsided below the weir-level, and a flood occurred completing its destruction.

GENERAL BUILDING NEWS.

NEW POLICE COURTS, ASTON, BIRMINGHAM.—The police courts and offices erected in Victoria-road, Aston, will be opened on Monday, October 15th next. The building is erected on the site of the old courts and adjoining ground, obtained by the demolition of several houses and cottages. The cells, which were in good condition, have been retained in the new building, which is in the free Renaissance style. The front elevation, to Victoria-road, is of red brick, with rich buff terra-cotta dressings. Two terra-cotta friezes and cornices run the whole length of the building, and these are supported by fluted pilasters with capitals. The upper frieze and cornice is surmounted by a terra-cotta parapet. From the roof, which is covered with green slates, rise two ventilating towers, the more important and higher of which is surrounded by a lantern. The heating and ventilation are on the system laid down by Mr. William Key, of Glasgow, and the same as that which has been adopted for the new General Hospital, Birmingham. The architects are Messrs. Mansell & Mansell, of Colmore-row; and the contractor, Mr. John Bowen, of Birmingham.

GESTINGTHORPE CHURCH, ESSEX.—On Thursday last this church, which has been under repair for the last seven months was re-opened. The nave arcade which had by the weight of the roof been thrust out of the perpendicular to an extent of 1 ft. 10 in. has been taken down and rebuilt. The timber roofs of the nave and aisle, which were particularly fine, had been almost entirely concealed by plaster. These have been reframed and refixed. The chancel arch which was filled in has been opened out but the fabric generally has been disturbed as little as possible. A new organ chamber has been built at the expense of Mr. W. E. Oates, of Gestingthorpe Hall. The work, which, owing to the critical condition of the building, involved considerable difficulty, was carried out by Mr. S. C. Parmenter, of Braintree, under the superintendence of Mr. A. Blomfield Jackson, architect, London.

ARTISANS' DWELLINGS, SHEFFIELD.—In carrying out the widening of Eyre-street, Sheffield, it has been found necessary to demolish twenty-three houses, and the Corporation will be under the necessity of erecting other artisans' dwellings in lieu thereof, as ordered by the Local Government Board in their provisional sanction. The Corporation have accordingly offered contracts for the erection of seven dwellings on land belonging to them, situate about 200 yards from those to be pulled down.

JEWISH SYNAGOGUE, LEEDS.—A new synagogue in St. John's-place, New Briggate, was opened on the 23rd inst. The edifice is of brick with stone dressings, and accommodates 1,000 people. A gallery, ornamented with wrought-iron work, runs round three sides of the interior. The cost of the whole has been about 1,500*l.* The architect is Mr. W. A. Hobson, of Albion-street, Leeds.

TECHNICAL SCHOOL, NELSON, LANCS.—The Technical School section of the Free Library and Technical School, erected by the Corporation of Nelson at a cost of about 12,000*l.*, exclusive of site, was informally opened on the 20th inst. The building, which has its main frontage to Market-street, is situated in the centre of the town, and will ultimately form the south wing of an extensive pile of municipal buildings. The public library will, as soon as possible, be accommodated in the Market-street end of the building. The structure is three stories in height, and on each floor has a central corridor, with the various rooms opening into it, with the exception of the second floor, where the corridor skirts the external wall.

MISSION CHURCH AND INSTITUTE, ASTON, BIRMINGHAM.—The foundation-stone of the new mission church and institute in course of erection in Park-street, Aston, was laid on the 24th inst. by the Bishop of Worcester. The buildings are estimated to cost about 4,500*l.*, exclusive of the site, and will comprise a working men's club, gymnasium, and smoking-room.

SCIENCE AND ART SCHOOLS, SKIPTON.—The new Science and Art Schools of the Skipton Mechanics' Institute were opened on Tuesday, the 25th inst. They are situated off High-street opposite the Town Hall, and have been erected at a cost of 3,863*l.*, exclusive of the land. On the ground floor is a lecture theatre, preparation room, lavatories, and secretary's room. On the first floor is the science section, which consists of a large chemical laboratory, &c., and on the top floor there are rooms for the study of perspective and architecture, painting, clay-modelling, and elementary art.

HOSPITAL EXTENSION, BELFAST.—On the 24th inst. a meeting was held in St. Mary's Hall, Belfast, for the purpose of inaugurating the fund for erecting additional buildings in connexion with the Mater Infirmorum Hospital, Crumlin-road. The site has a frontage of 230 ft. to the Crumlin-road, and is about an acre in extent, the soil being composed of red boulder clay. The *Belfast Newsletter* says that the hospital is designed on the pavilion system, the object being, as far as possible, to obtain an isolation of the wards, and the principal portions consist of three distinct blocks facing the Crumlin-road, the centre one being the administration building, flanked by a pavilion block on each side, that on the east being for males and the west one for females. These pavilions present their gable-ends to the Crumlin-road, and extend backwards and parallel to the east and west boundaries about 146 ft., and are connected on the ground floor only to the administration block by a wide corridor running east and west the entire length of the frontage, forming the main artery, so to speak, through the establishment. Each pavilion will be three stories in height, and will contain two large wards on each floor, provided with two sanitary chambers in towers, which branch off diagonally at the ends, and are separated from them by disconnecting corridors. The spaces formed outside the gable ends by the projections of these towers is utilised for verandahs for the use of convalescents. Each of the large wards is also provided with a ward kitchen and a small private ward containing only one bed. Between these extreme pavilions and the administration block is placed a smaller pavilion, which contains smaller wards and dayrooms for the convalescents. The hospital is planned for 137 beds and eight cots for children, and that for each bed is is allowed slightly over 1,300 cubic feet of ward space, and nine feet of wall space, and 100 square feet of floor space, some of the wards containing slightly more. The buildings are to be of red brick-work with stone dressings, and will be heated by steam and lighted by electricity. The principal entrance is to be in the centre of the administration, block, which will be slightly more ornamental than the adjoining buildings, and will be surmounted by a statue of the Mater Infirmorum, from whom the hospital derives its name. The architect is Mr. W. J. Fennell, C.E., of Belfast.

GRAMMAR SCHOOL, HINCKLEY.—The recently-erected grammar school buildings at Hinckley were opened on the 20th inst. The accommodation, in addition to a main schoolroom and class-room, consists of a dining-hall, lavatory, and laboratory with separate entrance, and playground, &c., adjoining. There is a commodious house for the head-master, immediately adjoining the school, and the whole is of red brick. The total cost has been about 4,000*l.* The architects were Messrs. R. J. & J. Goodacre, of Leicester, and the contractors Messrs. W. Moss & Son, of Loughborough.

ALTAR, ROMAN CATHOLIC CHURCH, NEAR WATERHOUSES, DURHAM.—There is now being erected in the Catholic Church at New House, Waterhouses, a high altar in the fourteenth-century style of architecture. The *Newcastle Daily Chronicle*

says that the altar-table, nearly a ton in weight, is of one solid block of Carrara marble, carved with passion-flowers, lilies, and roses, centred with rubies, the table being supported with Campan Vert and jasper marble shafts, with elaborately-carved white alabaster caps and bases, and jewelled annulets. In the centre panel of the frontal is an oil-painting of the dead Christ, in the arms of the Virgin Mary, and at each side, panels of passion-flowers in vases, surrounded with rich-tinted mouldings of polished alabaster, and filled in white marble. The base of the plinth is of Rouge Malplaquet marble. On the altar-table stands a repoussé and bejewelled tabernacle, surrounded by alabaster work, covered with costly carving, and in front rich Californian marble shafts, with carved alabaster bases and caps, and jewelled annulets. Flying buttresses of carved polished alabaster, independent of the tabernacle, support the Crucifix. On either side of the tabernacle there are arcades filled in with various marbles, Brocatello, Petitor, Bardilla Italian Griotte, Jasper Campan Vert, and Californian. Between the altar-table and the reredos are steps of Forest of Dean stone, by which the throne for benediction, in line with the reredos, may be reached. The throne itself consists of a corbel angel, bearing a scroll with inscription "Venite Adoremus," capped with a marble slab. The niche from which the angel springs is flanked with four Numidian marble shafts, with carved caps, surmounted by a groined canopy bearing angels, pinnacles, and cresting, completed by a pierced crocketed spire rising high up in the centre. The whole of this work and of the reredos is of white Beer stone. Above this, resting upon a moulded base on either side of the throne, are sculptured groups representing the "Dolours of Our Lady," under elaborately-carved canopies. The whole of the altar, &c., is said to be designed by Father Fortin, priest of the mission, and executed, under his instructions, by Mr. A. B. Wall, of Cheltenham.

SANITARY AND ENGINEERING NEWS.

ASHLEY DOWN, HORFIELD.—New sewage disposal works for this rapidly-increasing district of Bristol are now under construction. The method of disposal for which the works are being arranged is that of the International Company, but some special departures from the usual plan are being adopted, in order to render the effluent the very best obtainable. The works are situated close to the city, and the effluent will join a stream which runs through a thickly-populated district into the Frome. Instead of the original flat-bottomed settling-tanks open to the sun, the sewage will pass through circular vertical upward filtration-pits arranged within a tank-house, so as to be entirely cut off from sight of the houses near. The tanks are somewhat similar to those in use in Germany, and have already been successfully adopted by the engineer, Mr. A. P. J. Cotterell, C.E. The sludge will be pumped, without emptying the tanks, into covered sludge-pits, whence it will be forced into a sludge-press, being thus completely out of sight from beginning to end of the work, until it is turned into cake. The effluent water will be passed over filtration-beds, so arranged that in dry weather the whole effluent may receive double filtration. By these means it is expected that the highest standard of purity will be obtained.

WATER FAMINE AT LEICESTER.—The water supply of Leicester is still rapidly diminishing. The *Standard* says that even with a greatly diminished consumption on the one hand, and several auxiliary supplies on the other, the quantity in stock is so small that, unless something unexpected happens, not a drop will be left in stock on October 15. Gangs of men are engaged night and day sinking wells near the river Soar, where it is hoped supplies will be found; and pumping engines are being prepared to force the water direct into the water mains, without filtrations. This water is not expected to be very satisfactory as regards quality, but it seems the only resource left to save the stoppage of the factories. The water from the old reservoirs is getting very bad, on account of the supply being so low. A new reservoir is being constructed near Mount Sorrel, but a long period will elapse before it is available. At a meeting of the town council on the 25th inst. the chairman of the Water Committee stated that, from the engineer's point of view, only seven days' supply of water remained in the reservoirs. They might possibly go on seventeen days without endangering the public health, but that was the extreme period unless heavy rains fell in the meantime. The present scarcity was entirely due to the limited rainfall, which this year had been less than 16 inches, in addition to which the year was commenced with almost empty reservoirs.

ELECTRIC LIGHTING, FERMOY, IRELAND.—The Fermoy Town Commissioners contemplate lighting the town by electricity, and are now making an investigation as to the probable cost of so doing.

ELECTRIC LIGHTING STATION, DEWSBURY.—The works involved in the scheme for lighting Dewsbury with electricity are now practically complete. The lighting station in Bradford-road has cost about 3,500*l.*, and consists of an engine-room, boiler-house, and battery-room. The two dynamos have been supplied by Messrs. Crompton, of London; a local firm—Messrs. J. & J. Horsfield—have put in the boilers. The mains have been laid by Messrs. Siemens Bros., & Co., of London, their contract amounting to 3,856*l.* The area in which the Board of Trade, by their Provisional Order, made it compulsory for the Corporation to lay mains comprises the Market-place, Daisy-hill, Long-causeway, Church-street, Northgate, a portion of Bradford-road, and Wellington-road to the top of Nelson-street. The low-tension three-wire system has been adopted. Mr. W. H. Preece, now the chief electrical engineer to the Post-office, devised the scheme, which, partly under Mr. Preece's own superintendence, and partly under Mr. A. K. Greener, has now almost been carried out.

NEW BRIDGE, EDINBURGH.—On Monday last, at a meeting of the Lord Provost's Committee of the Edinburgh Town Council, Messrs. Cunningham, Blyth, & Westland, C.E., submitted plans of the proposed new North Bridge, prepared in accordance with instructions from the Corporation. The plans were approved, and orders were given to advertise for offers for the work. Mr. Robert Morham, City Superintendent of Works, undertook the preparation of the architectural work in connexion therewith.

POLLUTION OF THE RIVER MERSEY.—At the Leigh Police Court last Monday, the Leigh and Tyldesley Local Boards were each fined 20*l.* and costs, and an order made upon them to abate the nuisance within six months, for knowingly permitting the sewage from their sewage farms to run into brooks, and thence into the River Mersey, thereby polluting that river. The Mersey and Irwell Joint Committee prosecuted. The magistrates strongly intimated that both Boards had not attended to their duties.—*Liverpool Daily Post.*

BRIDGE, WYLAM, NEAR NEWCASTLE-ON-TYNE.—The extensive alterations and improvements to Wylam Bridge have recently been brought to a satisfactory completion. The new superstructure which has been placed upon the original strongly-built stone piers consists of steel plate girders with a decking of creosoted pitch-pine planking, 6 in. thick, laid at right angles across and overhanging the main girders, whilst on the upper surface is a layer of tar concrete paving. The clear width of the old roadway between the hand-rails, which are of iron with wood panelling in the two lower rail spaces, was about 11 ft., but this has now been increased to 14 ft. 6 in., the passage of vehicles being thereby greatly facilitated, besides adding considerably to the public comfort and safety. The contract was let to the Stockton Forge, Limited, Stockton-on-Tees. The engineers were Messrs. J. Watt, Sandeman, & Moncrieff, and Mr. George Bell, of Collingwood-street, was the clerk of works.

STAINED GLASS AND DECORATION.

WINDOW AT WINKLEIGH CHURCH, DEVON.—A rich stained-glass window has just been inserted in the parish church of Winkleigh. The subject represented is Abraham entertaining the angels, and the inscription at the base reads:—"To the glory of God, and in loving memory of George Luxton, born 1803, died 1889." The artist is Mr. F. Drake, of the Cathedral Close, Exeter.

MEMORIAL WINDOW, BANGOR, N. WALES.—On the morning of the 23rd inst., a stained-glass window was unveiled in St. Mary's Welsh Church, Bangor, to perpetuate the memory of the late Lord Penrhyn. It occupies a position in the eastern portion of the church, and has been prepared from the designs of Mr. Wyndham Hughes, Birmingham, who adopted "The Nativity" as the subject of the illustrations. The picture is framed with canopy work, in which there is a representation of "The Annunciation." The cost of the whole was 170*l.*

DECORATION OF BISHOP RYDER'S CHURCH, BIRMINGHAM.—This church, which has recently been extensively decorated, was reopened on Saturday, the 22nd inst. Amongst other new works the chancel arch is ornamented with spiral foliations on large mouldings and banded decorations on columns in colours and gold. The spandrils on either side of the chancel arch are enriched by representations of glorifying angels with trumpets, painted on a gold ground, and the decoration of the chancel itself is rich and elaborate. On either side of the east window are painted, under canopies, adoring angels on gold grounds. Many of the nave windows have been filled with stained glass. The builder's work was carried out by Mr. John Bowen; the decorations by Mr. W. Naughtin, from full-size designs and under the superintendence of Mr. W. H. Bidlake, architect, of Waterloo-street, Birmingham; and the figures were painted by Mr. G. T. Tarling.

MEMORIAL WINDOW, WIGAN.—A stained-glass window has been erected in the parish church, Wigan, to the joint memory of General the Hon. Sir James Lindsay, K.C.M.G., and of his wife, Lady Sarah Elizabeth Lindsay. It consists of four figures, representing Mercy and Truth, Righteousness and Peace. Messrs. Heaton, Butler, & Bayne were the designers.

WINDOW, ST. ANN'S CHURCH, BRADFORD.—We learn that a large stained-glass window will shortly be erected in St. Ann's Roman Catholic Church, Bradford. It will be a double one, with six lights, and is estimated to cost about 160*l.*

FOREIGN AND COLONIAL.

FRANCE.—The technical studies of the Metropolitan Railway of Paris are over, and it is thought that the Minister of Public Works will be able to draw out the bill on the Bureau of the Chamber of Deputies by the 15th November. In this bill the State claims no money, it demands only certain lands, and the abolition of all taxes on transports.——There are already 527 competitors for the 1900 Exhibition.——The Government have just commissioned the sculptor, Constaux Roux, to execute a marble bust of General de Lamoricière for the Government House at Algiers. It has also ordered a marble bust of Marshal Pelissier, to be executed by the sculptor Léon Roussel, and placed in the Mustapha Palace, near Algiers.——The exhibition of the Society des Amis des Arts, at Nantes, will open on the 1st February, and will remain open till the 28th.——The vestiges of a Pagan Temple have been discovered at Saint Similien, near Nantes, on the site of the church, together with some stone coffins, various ornaments, and even some remnants of clothing.——The municipality of Douai are shortly going to undertake some important works, the expense of which is estimated at one million four hundred thousand francs. The works are to include the demolition of the fortifications inside the Paris and Valenciennes gates, and the making of a public park near this latter gate.——The erection of a monument to Meissonier has just been begun at Poissy, on the Place de l'Eglise. The inauguration is to take place at the end of October.—A magnificent hospital, given by M. Henri Schneider, director of the Etablissement Metallurgique at Creusot, has just been inaugurated in that town.——The sculptor Alfred Boucher is executing at Aix-les-Bains the bust from life of the Grand Duke Alexis.—In excavating at Vienne, on the site of the old "Palais du Miroir," two fine marble statues have been discovered. They are both Roman. One, in a perfect state of preservation, is about two mètres high, and it is thought it represents the "Dea Roma." At its feet is a helmet. The other statue, of which the head has not been found, is that of a young girl. The marble of which the two are carved is of remarkably white tone and fine grain.——At Dreux, a few days ago, the old castle keep, in which is preserved the furniture formerly belonging to King Louis Phillipe, was damaged by lightning.——On Sunday, September 30, is to take place the inauguration of the monument erected at Montsous-Vausbrey to M. Jules Grévy. The monument is composed of a pyramidal pedestal in Jura stone, surmounted by a bronze bust of the former President of the Republic, by M. Carrier-Belleuse.——It is announced that the municipality of Lyons intend to acquire, at the price of 150,000 francs, the immense painting by M. Roybet of "Charles le Téméraire dans l'eglise de Nesle," exhibited last year at the Old Salon, and which procured for its author (rather to the surprise of many critics) the Grand Medal of Honour of the Salon.——The death is announced of M. Eugène Delahaye, editor of the journal *La Reforme du Bâtiment*, at the age of fifty-eight.——A financial society proposes to construct, in Paris, a large hippodrome, to be built on piles between the Pont Neuf and the two arms of the Seine. The floor would be on a level with the statue of Henri IV,, and the entrance from the Pont Neuf.

GERMANY.—Some interesting particulars of the career of Professor Reusch, the sculptor of the Königsberg Emperor William monument, are published in the *National Zeitung*. Born in 1843, at Siegen he came to Berlin in his nineteenth year, where he entered the Academy of Art and secured several prizes. In 1872 he won the Michael Beer studentship by his "Awakening of Lazarus," which enabled him to study for two years at Rome. On his return to Berlin he was very active, his chief works being the war monuments at Siegen and Bensberg, and the statuary for the Ministry of Commerce at Berlin, for the Belle-Alliance Bridge, and for the Criminal Courts at Moabit. His "Demon of Steam" attracted much favourable attention at the 1880 Art Exhibition. In 1881 he removed to Königsberg, where he was the author of a number of groups and statues for the Königsberg Government offices, as well as of several historical busts and monuments. At present he is engaged on an equestrian statue of the late Emperor William for a South German town.——Traces of a Roman castle at Cannstadt, near Stuttgart, the former existence of which has long been taken for granted, have been discovered by Dr. Kapff in the meadows known as "Auf dem Staig." The north-eastern angle has been laid bare, and further excavations are being undertaken by the Imperial "Limes" Commission.——In the competition held under the auspices of the *Vereinigung Berliner Architekten* for the designs of a large building on a plot between the Leipziger Platz and the Voss-Strasse, Berlin, the first premium of 150*l.* was awarded to Herr Ludwig Engel.——Yet another plan has been handed in to the Municipality for improved communications in Berlin—viz., a suspended electric railway, on the Eugen Langen system.——Messrs. Siemens are about to start work on the electric tramway between Gesundbrunnen and Pankow, although certain legal details have still to be settled.——The fountain by the sculptor Uechtritz, the design of which was acquired for Berlin, is being

cast, and will be set up in the Rosenthalerstrasse.——It is proposed to build a new church and vicarage in the Brandenburg Vorstadt at Potsdam at a cost of about 18,000*l.* Of this sum the community will contribute 10,000*l.*, and it is expected that the Emperor will grant the rest.——Herr Paul Wallot, the architect of the new Imperial Houses of Parliament, has proceeded to Stockholm at the invitation of the Swedish Government, to report on the much-contested plan to erect new buildings for Parliament and for the Royal Bank on the island of Helgeandsholmen in that city.——Excavations at Flörsheim, near Mayence, undertaken under the direction of Professor Wolff, of Frankfort-on-Main, have resulted in the discovery of the walls of a Roman house dating, presumably, from about 50 A.D.

AUSTRIA.—An exhibition in connexion with the Congress of Natural Historians was recently opened by Herr von Madeyski, Minister of Education, at the Vienna University. Among the exhibits are a great number of views and plans of the State Hospitals and Asylums, as well as an international collection of designs for crematoriums.

RUSSIA.—The Ministry of Communications has granted a concession to an American Syndicate to build a large engine factory in Russia, and has given an order there for thirty locomotives. This is the first time for a considerable period that permission has been given to a foreigner to enter into industrial enterprise in the country.——The foundation-stone of a cathedral for the orthodox faith was laid at Warsaw with much ceremony on the 12th inst., the Czar's name-day.——Traffic for passengers has been opened between Omsk and Tcheljabinsk, the most western section of the Great Siberian Railway.——The successful conclusion of the Commercial Treaty with Germany has led to proposals for several new railway lines across the frontier, which, according to the *Novoia Vremia*, are now being considered by the Government.

SWEDEN.—A new town hall is in course of erection in the city of Helsingborg, on the Sound, with a huge tower, but some while ago it was discovered that the latter leaned considerably out of the perpendicular. The work was then stopped, and a commission appointed to consider the matter. This body reports that owing to the defects of the two western piers on which the tower rests they are now supporting the structure to the extent of 70 per cent., the two eastern piers receiving only 30 per cent. of the weight. They are, however, of the opinion that no further subsidence will take place in this corner, and that the erection may be continued safely.——The Sulphite Factory at Storvik has been rebuilt, having been burned down in February, 1893. The former buildings were entirely built of timber, but nearly all the new ones are of stone, the woodwork being protected by "Gipsdielen," a fireproof substance produced in Germany. The work of re-erection has only occupied six months, a remarkable short space of time in Sweden. The cost of the new buildings is 800,000 kr. They have been designed and carried out by Herr V. Folin, Civil Engineer.——The Building Committee of the great Industrial Exhibition to be held in Malmö in 1896, has been constituted, but in the local press some comment has arisen as to the absence of the name of the City Architect, Professor Klein, from the list of members. The exhibition buildings will be erected in the "Hösthagen," a meadow which is to be turned into a park, and when the exhibition is over, the erection of a city museum on the site is contemplated. The park is therefore to be called the "Museum Park." The covered area of the exhibition buildings will be about 10,000 square mètres, and the cost about 165,000 kr.

NORWAY.—For the last two years Government proposals have been before the Storthing to erect a block of new Government offices in Christiania on a site belonging to the State. Designs have been invited, and three accepted provisionally—*i.e.*, one by Herr H. Bull and Herr Fürst cojointly, one by the latter alone, and one by Herr Lenschow—all prominent Norwegian architects. Herr Bull is at present entrusted with the erection of the new National Theatre in Christiania. Of these designs, that of Herr Lenschow is undoubtedly the most imposing, but it is, on the other hand, the most costly. Herr Bull suggests a plainer structure, perhaps in more harmony with the unpretentious official buildings in the Norwegian capital. The undertaking will be the greatest of its kind ever entered upon in Norway, the cost of the building in complete state being estimated at upwards of 4,000,000 kr. It is expected that the coming Storthing will vote the first instalment towards it.——A committee has been appointed by the Corporation of Christiania to formulate a scheme for the building of a new town-hall there. It consists of four members, one being a Minister of State, one Herr Schirmer, the well-known architect, and one a master builder.——The large new allegorical group in the pediment over the façade of the Christiania University has been unveiled with great ceremony. It is executed by Herr Skeibrok.——We illustrated last week a villa to be built on the island, Næsön, for Herr Carl Hagman, a Swedish operatic singer, by Herr Folke Zettervall. Herr Hagman has now commissioned another Swedish architect, Herr Carl Ostermann, to prepare designs and plans for a new substantial residential mansion to be built on the mainland. Herr Ostermann was awarded a gold medal at the Paris Exhibition, mainly for his theatre projects.——A building for business purposes has been added to "modern" Christiania. The façade is very effective, the lower portion being faced with polished white Norwegian marble, and the upper portion with red polished granite.——One of the most imposing buildings ever erected in Norway is the Grand Central Masonic Lodge, just completed in Christiania. It is situated in close proximity to the Houses of Parliament, and opposite to the Royal Palace, the new theatre, &c. The building consists of two separate parts, one for the sole use of Masons, and the other for the public. In the latter there is a large restaurant and verandah, with dining-rooms, private assembly-rooms, &c., and in the Masonic section are eight spacious halls for the various grades of the order. Throughout the entire interior practically no other material than marble has been employed, in all colours. The designer of this "marble palace," as it is styled by Christiania journals, is Herr H. Nissen, a leading Norwegian architect.

MISCELLANEOUS.

FONT, ALTRINCHAM.—A new memorial font has been placed in the church, executed by Messrs. J. & H. Patteson, Manchester. It is of octagonal form, and in Derbyshire alabaster, the basin being supported by a column of red Devonshire marble, with carved capitals.

SOCIETY OF ENGINEERS.—The Council of the above society has elected Mr. Perry F. Nursey, a Past President, and for thirty-six years a member of the society, as honorary secretary and treasurer, in place of the late Mr. Alfred Williams, who had occupied the position since the foundation of the society in 1854.

THE DRAINING OF THE ZUYDER ZEE.—The draining of the Zuyder Zee is now definitely decided upon. It is expected that the great work may be accomplished in thirty-two years, at an expenditure of 25,000,000*l.*, and a gain in land, &c., of 26,100,000*l.*

A NORWEGIAN BRONZE.—The Museum of Antiquities in Christiania has just received an interesting find, viz., the largest bronze vessel yet discovered in Norway. These bronze vessels date from the great tribal changes of abode in the seventh and eighth centuries before Christ. They are mostly found on the west coast of Norway, in burial chambers. The vessel discovered exceeds in dimensions any hitherto found, its diameter at the lip being 87 centimètres, the circumference at the rim 2·72 mètres, and the greatest circumference at the bottom 3 mètres. The height is, however small, only 43 centimètres, as is the case with all these vessels.

DISCOVERY AT LINCOLN CATHEDRAL.—A most interesting discovery has just been made in the morning chapel of Lincoln Cathedral. It has been found that the existing floor is not the original floor of the chapel. The *Nottinghamshire Guardian* states that the old altar step has been laid bare, and this will be allowed to remain, the floor being relaid on the original level. The foundations of a large buttress were also uncovered, with traces of a wall to the north and another to the east, and it is probable that they formed the boundary walls of a Norman chapel which stood on the site prior to the date when the aisles of the nave were narrowed. There has also been brought to light a gravestone, supposed to be Saxon, but having about it certain Roman characteristics. On the face of the stone are two crosses, one within the other, and round the edge is a cable moulding. The moulding, however, does not extend to that part which would be placed in the ground when the stone was set in position.

NOTTINGHAM ART GALLERY.—An exhibition of the works of Cornish painters, of Newlyn, St. Ives, Falmouth, &c., has been opened at this gallery. The private view was fixed for Friday this week.

ARCHÆOLOGICAL AND ARCHITECTURAL SOCIETY OF DURHAM AND NORTHUMBERLAND.—The fifth meeting of this society was held on Thursday, the 20th inst., at Guisborough, Grey Ayton and Newton. Guisborough, it may be noted, is the site of a once important monastery of Augustinian Canons, founded, most probably, in 1119, by Robert de Brus. The remains of the church still comprise many portions of extreme beauty, and show that it must have been among the finest of the many splendid examples of Mediæval church architecture in which Yorkshire is so rich. The history was related by Mr. William Brown (editor of the *Guisbro' Cartulary*), and the architectural features explained by Mr. Hodges. The parish church was visited, in which is placed the very remarkable "Bruce Tomb."

CAPITAL AND LABOUR.

TERMINATION OF THE BOLTON LOCK-OUT.—The lock-out in the Bolton building trade, which has lasted for three weeks, terminated on Monday last. The masters were forced to lock-out men to the number of over a thousand in order to settle disputes in the stonemasons' and plumbers' branches, as already announced in our columns. The operative stonemasons did not object to machinery, but wanted to restrict the working hours of the machines. They, however, withdrew this, and the plumbers have withdrawn their objection to the employment of book-keepers under twenty-one, but they insist on fining two employers in one case 20*l.* The shops were opened on Wednesday, the plumbers' dispute being left for the masters to arrange.

MEETINGS.

SATURDAY, SEPTEMBER 29.

Glasgow Architectural Association.—Visit to Linlithgow.

Northern Architectural Association.—Visit to Prudhoe Hall. Central Station, Newcastle, 2 p.m.

MONDAY, OCTOBER 1.

Society of Engineers.—Mr. T. W. Baker on "The Utilisation of Town Refuse for Generating Steam." 7.30 p.m.

TUESDAY, OCTOBER 2.

Glasgow Architectural Association.—Mr. W. Fraser on "Planning of Country Houses." 8 p.m.

WEDNESDAY, OCTOBER 3.

King's College.—Distribution of Prizes in architecture, by the Carpenters' Company. Professor Banister Fletcher on "An Architect's Rambles amongst London Buildings." 7.30 p.m.

Builders' Foremen and Clerks of Works' Institution.—Ordinary meeting of Members. 8.30 p.m.

RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

15,725.—SYPHON WASTE PREVENTER: *M. Syer.* The object is to form an air trap in the flush pipe, so that the water in the cistern may be retained until the confined air is allowed to escape either by means of the self-closing push fixed in the down pipe, or by raising the cover in the cistern. Mechanical means of accomplishing this end is described in the specification.

15,869.—ROOFING TILES: *C. Manchip.*—Relates to tiles made by hand or machine from clay, which are punched, pierced, or marked at one operation by a long bar with punches attached. Here the bar has the punches attached, also the markers or guides, and the marking, punching, and cutting is done at one operation.

16,190.—GREENHOUSE GLAZING: *C. Osborne.*—To obviate the use of wooden or metal supports over the framework of the building, iron wires are strained to form the supports for the panes, which are held firmly in place by clips of wire bent so as to firmly grip them. It is claimed that this is lighter, more durable, and very economical.

17,746.—FLUSHING WATER-CLOSETS: *C. Horton.*—This is a double water-closet cistern which is flushed automatically at intervals by means of an oscillating flushing tank worked by trickling water. It first flushes one side and then the other as the water fills the rocking receptacle.

2,625.—WINDOW FASTENING.—*H. Vietig* (Lubeck).—The device for fixing the window consists of a crosswise-supported bar hinged or pivotted and connected at one end with an eccentrically supported lever clamped in an E shaped guide-piece, and actuated by one movement of this lever.

9,773.—WATER-WASTE PREVENTER CISTERNS: *T. Atkins.*—In the body of the cistern is fixed a simple syphon with the shorter end widened and on either the inside or outside of which works a lifting bucket or plunger for the purpose of charging it.

12,233.—CONCRETE PAVEMENTS: *A. J. B. Ward.*—The squares or patterns are made in lead moulds, into which the concrete is afterwards filled; this provides a non-slipping surface.

13,354.—DIES FOR FLANGED TILES: *M. Harczyk* (Warschau, Russia).—An improved press-mould for the manufacture of Dutch tiles and other stove parts provided with flanges. The purpose is to make such articles from powdered materials by exposing the latter to such pressure and in such a way that the body or tile proper is pressed but once; the flange is pressed twice to ensure solidity.

13,593.—CHIMNEY COWL: *E. W. Lovegrove.*—The improved cowl is formed with a head or horizontal arm with a vertical blade fixed to it which ensures its head being kept pointed away from the wind in whatever part it may be blowing. This head is divided for part of its length into two passages, one leading from the chimney, the other opening into the atmosphere, both passages meeting near the end of the head. The open end of the air-passage is pointed toward the wind, so that a current of air will pass through the cowl when any wind is blowing, and will draw up the smoke from the chimney.

NEW APPLICATIONS FOR LETTERS PATENT.

SEPTEMBER 10.—17,185, C. Steel, Device for connecting and detaching lines used for Window-sashes, and other Sliding Frames.—17,208, F. Lenders, Composition for forming a substitute for stone, marble, plaster, &c.—17,221, J. Rueben, Fireproof Ceilings.

SEPTEMBER 11.—17,232, F. Hayes, Wood-block Paving and Pavements.—17,238, J. Spear, Apparatus to stop the noise of the inrush of water to Water-closet Tanks.—17,243, J. Questier, Glazing greenhouses, railway-stations, &c.—17,276, J. Knittel, Hinges.—17,282, J. Hamblet, Kilns for burning bricks, tiles, drain-pipes, &c.—17,249, E. & E. Baller, Door Latch and Bolt combined.

SEPTEMBER 12.—17,366, Craven, Dunnill & Co., Ltd., and T. Pitt, Manufacture of Tiles.

SEPTEMBER 13.—17,403, B. Cochrane, Bricks,—17,427, H. Foot, Hinge, applicable also as a Fastener for Doors.—17,432, W. Cliff, Water-closets.—17,437, C. Cload and W. Mardon, jun., Door Fastener.

SEPTEMBER 14.—17,467, J. Fagan, Flushing Cisterns for Water-closets.—17,480, P. Lyle, Glazing Bars or Astragals for Roof-lights and Windows.—17,487, G. Skinner, Paint-spraying Appliances worked by Compressed Air.—17,499, F. Woodford, Chimney Cowls.—17,522, W. Crombie and others, Mortice Bolts.—17,544, E. Tessen, Compounds for Destroying or Removing Old Paints.

SEPTEMBER 15.—17,597, W. Lake, Apparatus for Making Mortar.

PROVISIONAL SPECIFICATIONS ACCEPTED.

9,177, J. Potter, Screw-drivers.—11,973, J. Stow, Preparing Concrete.—13,529, W. Matthews, Combination Inlet and Outlet for Baths and Lavatories, &c.—13,810, E. Kendall, Window-sashes.—14,308, A. Carey, Construction of Buildings, &c., of Skeleton Framework and Cement, &c.—14,960, W. Griffith, Butt and Hinge for Doors and Gates.—15,055, L. Turnock, Window-fasteners.—15,175, M. Bohn, Roofing Tiles.—15,531, H. Diamond, Indicating Device for use in Connexion with Doors.—15,729, R. Papineau and C. Beresford, Preservation of Buildings in

COMPETITIONS AND CONTRACTS.

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered.
School Buildings, Whitland, Carmarthen	J. Griffiths Rees.....	.....	Oct. 26
*Museum for Antiquities, Cairo	Egyptian Government	First 600*l.* and 400*l.* between the next four	Mar. 1, '95

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
School Buildings, Doe Lea, near Chesterfield	Ault Hucknall Sch. B.	Rollinson & Son	Oct. 2
Six Cottages, Woodstone-lane, Peterborough	.....	Jas. Ruddle	do.
Schools, near Burton-on-Trent.....	Stanton and Newhall School Board.....	H. Beck	do.
Isolation Hospital, Herringatone-road	Dorchester Town Coun.	G. J. Hunt	do.
Alterations to Police Station, Hulme	Manchester Corp. ..	*Official*	do.
Granite Road Metal (700 tons).....	Aldershot Local Board	do.	do.
Making Two Streets.....	Rawmarsh (Yorks) Loc. Board	do.	do.
Retaining Walls, &c.	Dorchester Town Coun.	do.	do.
Road Metal, Clee Hill, &c.....	Stroud Local Board ..	do.	do.
*Additions to Porter's Lodge, Outlet Sewer, &c. at Cemetery, Ilford.....	Com. of Sewers	do.	do.
Residence at Schools, Durham	Crook and Billy Row School Board.....	do.	Oct. 3
Additions to Schools	do.	do.	do.
Sewerage Works, Camelon, N.B.....	Stirlingshire C. C. .. .	Warren & Stuart.....	do.
Cast-iron Water Pipes (1,500 yds.)	Cramlington Loc. Bd.	A. S. Dinning	do.
Schools, Lee Mount	Halifax School Board	J. F. Walsh.....	do.
*Stoneware Sewer Pipes	Borough of Ipswich ..	*Official*	Oct. 4
Schools, Graffham, Sussex.....	Graffham and East Lavington Sch. Bd...	do.	Oct. 5
Warehouse, Batley Carr, Yorks	.....	P. Spencer & Son.....	do.

CONTRACTS—*Continued.*

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
*Waterworks.....	Redruth Local Board	H. B. Nichols	Oct. 6
Pipe Sewer (3,000 ft.), &c. Berry Head-road	Lower Brixham(Devon) Local Board	W. H. Widdicombe ..	Oct. 8
Church, Tylorstown, near Pontypridd....	.....	G. E. Halliday.....	do.
Stables and Shed, Aberdeen	Campbell's, Limited ..	Jenkins & Marr	do.
Street Works, Hyde Park-road, &c.	Harrogate Corporation	S. Stead.....	do.
Surveyor's Materials	Batley (Yorks) T. C. .	H. Dearden	do.
House at Sewage Works, Thatcham	Newbury U.S.A.....	*Official*	do.
Drainage Works, Guildford	Royal Surrey County Hospital	do.	do.
Road Metal (3,500 tons)	Leamington Corp.	do.	do.
Works, Arundel-street, Thorpe-road, &c..	Walsall Corp.	do.	do.
*Road Works	Lewisham Bd. of Wks.	do.	Oct. 9
Station Buildings, &c. Baschurch, Salop..	Gt. W. Railway Co. ..	do.	do.
Surveyor's Materials	Wilton (Wilts), U.R.S.A.....	Jno. Goulden	do.
*Broken Granite and Granite Spalls	Hackney Vestry.....	J. Lovegrove	Oct. 10
*Alterations, &c. to Heating Arrangements at Workhouse	Holborn Union	A. Saxon Snell	do.
*Public Underground Convenience	Hackney Vestry.....	J. Lovegrove	do.
*Additions, &c. to S.W. Fever Hospital....	Managers Met. Asylums District	*Official*	Oct. 11
Additions to Schools, Cadoxton-juxta-Barry, Glam.	Barry U.D. Sch. Bd...	Geo. Thomas	Oct. 12
Bridge	Edinburgh Corp.	Cunningham, Blyth, & Westland	Oct. 13
*Second Portion of Proposed New Buildings Post Office Savings Bank.....	H. M. Works.....	*Official*	Oct. 15
*Waterworks	Wakefield Corp.....	H. Rofe	Oct. 16
*Fire Station	Birkenhead Corp.	C. Brownridge.....	Oct. 18
Additions to Schools, Forster-street	Nottingham Sch. Bd.	R. C. Sutton.....	No date
Two Houses, Burnopfield, Lintz-green, Durham	Thos. Stafford	.....	do.
Villa, Llandrindod Wells	Miss Wilding	A. B. & W. [Scott Deakin.....	do.
Vicarage House, Llantillio, near Abergavenny	.....	Halliday & Anderson	do.
Pair Semi-detached Villas, Fairfield, Ashton-under-Lyne	.....	J. H. Burton	do.
Two Houses, Blencathra-street, Keswick..	.....	W. Grisenthwaite	do.

Those marked with an asterisk (*) are advertised in this Number. *Competitions, p.* iv. *Contracts, pp.* iv., vi., viii. *and* xxi.

Case of Fire.—15,936, C. Parsons, Window-fasteners.—16,010, C. Polden, Window-sash Fastener.—16,031, J. Sinclair, Window-sashes.—16,457, W. Couper, Ranges, &c.—16,462, W. Hodgson, Water-closets.

COMPLETE SPECIFICATIONS ACCEPTED.

(Open to Opposition for Two Months.)

19,833, F. Diets, Ventilation.—20,616, R. Bowes, Fire places or Hearths.—21,218, R. Crosthwaite, Fire-grates.—21,378, J. Sherratt and others, Terra-cotta Chimney Tops, Wind Guards, &c.—21,876, G. Dean, Hoffman's Kiln.—22,105. H. Defries, Window-frames.—15,440, A. Dandridge, Tunnels.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

SEPTEMBER 11.—By *Walton & Lee* (at Torquay): "The Windmill Hill and Daison Properties," Torquay, nine plots of f. land, 10 a. 1 r. 9 p., 1,797*l.*; five plots of f. land, 7 a. 3 r. 6 p., 1,350*l.*; a plot of land, 1 a. 0 r. 9 p., 250*l.*; Old Woods Brick Works, 8 a. 3 r. 15 p., 3,400*l.*; several enclosures of land, 17 a. 3 r. 19 p., 2,300*l.*; Upton Cottage and 3 a. 1 r. 14 p., 675*l.*; an enclosure of f. land, 5 a. 2 r. 13 p., 1,500*l.*; the Upton Timber-yard and land, 6 a. 2 r. 3 p., 950*l.*; two plots of land, 0 a. 2 r. 35 p., 290*l.*; Vine Cottage and 0 a. 1 r. 25 p., 300*l.*; the Torre Building Estate, 17 a. 1 r. 13 p., 2,750*l.*

SEPTEMBER 12.—By *Walton & Lee* (at Torquay): "The Upton Estate," Torquay, f. house and 0 a. 0 r. 39 p., 420*l.*; numerous plots and enclosures of land, 9 a. 3 r. 30 p. 2,000*l.*; four plots of f. land, 460*l.*; enclosures of pasture and orchard land, 2 a. 2 r. 33 p., 630*l.*; two cottages and 0 a. 0 r. 26 p., 230*l.*; "The Ellacombe Estate," three enclosures of building land, 5 a. 0 r. 17 p., 1,315*l.*; moiety of the rental of Market Yard, r. 15*l.* 15s., 150*l.*; "The Lincombe Estate," four plots of land, 3 a. 2 r. 20 p., 1,250*l.*; a plot of land, 0 a. 2 r. 33 p., 130*l.*

SEPTEMBER 13.—By *Worsfold & Haywood* (at Dover): Dover—3, 4, Limekiln-st., u.t. 34 yrs., g.r. 7*l.*, 150*l.*; 11, Queen-st., f., r. 50*l.*, 900*l.*; 5, 6, Prince's-st., f., 405*l.*; Charlton, 2, Avenue-rd., f., r. 19*l.* 10s., 310*l.*; Buckland, 71, Oswald-rd., f., 200*l.* St. Margaret's.—East and West Villas, f., 1,050*l.*; "Martin Vale Cottage," f., 260*l.*

SEPTEMBER 13 and 14.—By *Walton & Lee* (at Torquay): "The Coombe Pafford Estate," Torquay (near).—F. house and shop, dairy, and 2 a. 0 r. 13 p., 795*l.*; The Lummanton Quarries and 12 a. 0 r. 4 p., 1,000*l.*; The Etruscan Dairy and 0 a. 1 r. 12 p., 355*l.*; Torquay race-course, 64 a. 2 r. 32 p., 8,000*l.*; numerous cottages and land, 10 a. 3 r. 19 p., 3,150*l.*; numerous enclosures of building, fruit, and accommodation lands, 110 a. 3 r. 20 p. 14,251*l.*

SEPTEMBER 17.—By *Henry & Latchford*; 44, 46, 48, St. Luke's-rd., Clapham, u.t. 89 yrs., g.r. 25*l.*, r. *l.*, 700*l.*; 42, Mayflower-rd., u.t. 88 yrs., g.r. 10*l.*, r. 50*l.*, 465*l.*—By *Thomas, Peyer, & Miles*: "The Marlborough Brewery," Marlborough, with plant, residence, and eight public-houses, part f. and part l., 8,000*l.*

SEPTEMBER 18.—By *Wagstaff & Warman*: 20, 22, 24, Highbury Park, u.t. 68 yrs., g.r. 51*l.*, r. 193*l.*, 1,650*l.*; 112, 114, Bemerton-st., Barnsbury, u.t. 50 yrs., g.r. 10*l.*, 255*l.*—By *Rutley, Son, & Vine*: 77, Mornington-rd., Regent's Park, u.t. 44 yrs., g.r. 10*l.*, 500*l.*; 57, William-st., Hampstead-rd., u.t. 28 yrs., g.r. 8*l.*, r. 40*l.*, 325*l.*; 111, Princess-st., Edgware-rd., u.t. 27 yrs., no g.r., 225*l.*—By *Humbert, Son, & Flint* (at Watford): "The Grey House," Alexandra-rd., Watford, f., r. 70*l.*, 1,000*l.*; a plot of f. land, St. Mary's-rd., 750*l.*

SEPTEMBER 19.—By *Beadel, Wood & Co.*: Grays, Essex.—"Grays Hall" and 4 a. 3 r. 39 p., u.t. 72 yrs., g.r. 25*l.*, 1,400*l.*; Twelve cottages and plot of land, u.t. 73 yrs., g.r. 4*l.*, 1,200*l.*—By *Humbert, Son, & Flint*: The Residence, "Antoneys," Pinner, and 10 a. 3 r. 36 p., f., 3,925*l.*; Mary's cottages, West Drayton, f.g.r. of 3*l.* 12s., reversion in 89 yrs., 85*l.*—By *D. Young*: 8, Park Walk, Brixton, u.t. 187 yrs., g.r. 8*l.* 5s., r. 44*l.*, 325*l.*; 5, Pembury-rd., Clapton, u.t. 55 yrs., g.r. 10*l.*, 400*l.*

SEPTEMBER 20.—By *H. J. Bliss & Son*: 1 to 10, and 13 to 16, Royley-st., Finsbury, u.t. 11 yrs., g.r. 64*l.*, 840*l.*; 1 to 19 odd, Palm-st., Bethnal Green, u.t. 38 yrs., g.r. 31*l.* 10s., 1,400*l.*; 6, Roman-rd., u.t. 38 yrs., g.r. 3*l.* 3s., 200*l.*; 17 to 23 odd, Fellbrigg-street, u.t. 36 yrs., g.r. 10*l.*, 400*l.*; Upper Kennington-lane, Vauxhall, f.g.r. of 30*l.*, reversion in 53 yrs., 800*l.*—By *D. J. Chattell*: 3, 5, St. John's-ter., Southall, f., r. 65*l.*, 760*l.*

SEPTEMBER 21.—By *Flood & Sons*: 13, 15, Harrow-rd., Edgware-rd., u.t. 31 yrs., g.r. 80*l.*, r. 207*l.*, 1,325*l.*; 8, Netley-st., Hampstead-rd., u.t. 20 yrs., g.r. 10*l.* 15s., r. 50*l.*, 380*l.*; 10, Sutherland-place, Westbourne-grove, u.t. 52 yrs., g.r. 11*l.*, r. 55*l.*, 380*l.*

[*Contractions used in these Lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.]

PRICES CURRENT OF MATERIALS.

TIMBER.			
Greenheart, B.G.	ton	8/0/0	0/0/0
Teak, E.I.	load	20/0/0	26/0/0
Sequoia, U.S.ft.cu		1/10	2/2
Ash, Canada	load	3/0/0	4/5/0
Birch, do.		2/15/0	4/0/0
Elm, do.		3/15/0	5/0/0
Fir, Dantsic, &c.		1/5/0	3/0/0
Oak, do.		2/10/0	4/10/0
Canada		5/15/0	7/5/0
Pine, Canada red		2/10/0	3/0/0
Do. Yellow		3/0/0	5/5/0
Lath, Dantsic, fath		4/10/0	5/10/0
St. Petersburg		5/0/0	6/10/0
Wainscot, Riga, &c., log		2/15/0	5/0/0
Odessa, crown		2/15/0	5/0/0
Deals, Finland			
2nd & 1st std	100	7/10/0	9/10/0
Do. 4th & 3rd		7/0/0	8/10/0
Do. Riga		7/10/0	9/0/0
St. Petersburg, 1st yellow		10/0/0	13/0/0
Do. 2nd yellow		8/0/0	10/0/0
Do. white		8/10/0	11/0/0
Swedish		7/10/0	16/0/0
White Sea		7/0/0	15/0/0
Canada, Pine 1st		22/10/0	27/0/0
Do. do. 2nd		17/0/0	18/0/0
Do. do. 3rd, &c.		7/10/0	10/10/0
Do. Spruce, 1st		8/10/0	11/0/0
Do. do. 3rd & 2nd		6/10/0	7/10/0
New Brunswick		6/0/0	7/5/0
Battens, all kinds		9/0/0	15/0/0
Flooring boards, sq., 1 in. prep. 1st		0/9/6	0/14/6
Do. 2nd		0/7/0	0/11/6
Other qualities		0/5/0	0/6/6
Cedar, Cuba	ft.	/3½	/4½
Honduras, &c.		/3½	/4½
Mahogany, Cuba		/3½	/6
St. Domingo, cargo av.		/3	1/6
Mexican do. do.		/3	/4
Tobasco do. do.		/3½	/6
Honduras do.		/3½	/5½
Box, Turkey	ton	4/0/0	13/0/0
Rose, Rio		7/0/0	18/0/0
Bahia		6/0/0	17/0/0
Satin, St. Domingo		0/0/5	0/1/0
Satin, Porto Rico		0/0/6	0/1/6
Walnut, Italian		0/0/3½	0/0/7
METALS.			
Iron—Pig, in Scotland	ton	2/3/4½	0/0/0
Bar, Welsh, in London		5/12/6	5/15/0
Do. do. at works in Wales		5/2/6	5/5/0
Do. Staffordshire, in London		6/0/0	6/10/0
COPPER—British cake and ingot		44/0/0	44/10/0
Best selected		44/10/0	45/0/0
Sheets, strong		53/0/0	54/0/0
Chili, bars		41/7/6	41/12/6
YELLOW METAL	lb	0/0/4½	0/0/4½
LEAD—Pig, Spanish	ton	9/16/3	0/0/0
English com. brands		10/0/0	0/0/0
Sheet, English, 6 lbs. per sq. ft. and upwards		10/15/0	11/0/0
Pipe		11/15/0	0/0/0
ZINC—English sheet	ton	28/10/0	29/0/0
Vieille Montagne		29/10/0	0/0/0
TIN—Straits		71/5/0	71/15/0
Australian		71/10/0	72/0/0
English Ingots		75/10/0	76/0/0
Banca		75/0/0	75/10/0
Billiton		73/10/0	74/0/0
OILS.			
Linseed	ton	20/17/6	21/5/0
Cocoanut, Cochin		29/10/0	0/0/0
Do. Ceylon		25/0/0	0/0/0
Palm, Lagos		25/0/0	0/0/0
Rapeseed, English pale		22/0/0	0/0/0
Do. brown		20/10/0	0/0/0
Cottonseed ref.		20/10/0	21/5/0
Oleine		22/0/0	24/0/0
Lubricating, U.S.		4/0/0	5/0/0
Do. refined		8/0/0	12/0/0
TAR—Stockholm	barrel	0/0/0	0/0/0
Archangel		0/11/0	0/0/0

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursday.*]

ABERCARN.—For the construction of a steel lattice girder bridge (50 ft. span) over the River Ebbw, Cwmcarn, for the Abercarn and Risca Local Boards. Mr. Geo. Stephens, Surveyor, Local Board offices, Abercarn:—

Dempster & Co.	£672 0 0	T. D. Steel	£556 0 0
Baker & Co.	622 12 9	Abercarn Engineering Co., Abercarn*	500 0 0
Isca Foundry Co.	621 0 0	E. H. Page	508 4 6
J. Moseley	610 0 0	Finch & Co.	480 0 0
A. D. Dawnay	600 0 0		
Fairbank	584 0 0		

* Accepted.

BARNSLEY.—Accepted for alterations to schools, Worsborough Common, also erection of school buildings, for the Worsborough School Board. Messrs. Senior & Clegg, architects, 15, Regent-street, Barnsley:—

Masonry.—C. Lawton & Sons, Barnsley	£1,529 0
Carpentry and Joinery.—Hammerton's Exors., Worsbro' Dale, Barnsley	552 0
Plumbing.—J. Snowden & Son, Barnsley	277 0
Slating.—E. Fleming, Barnsley	149 10
Plastering.—E. Fleming, Barnsley	85 0
Painting.—W. Todd, Barnsley	97 0

CARNARVON.—For the erection of a mill at the New Harbour, for Mr. J. Prichard. Mr. E. Evans, C.E., 8, Castle-street, Carnarvon:—

Evan Jones	£3,610	D. Williams & Son, Carnarvon (accepted)	£2,869
Owen Morris	3,175	R. R. Williams	2,720
Hugh Hughes	2,986		

CATFORD.—Accepted for the erection of a villa residence, "Davenport," Davenport-road, Rushey Green, Catford, for Mr. F. G. Armfield. Mr. Joseph G. Denton, architect, 77, Edith Grove, Chelsea, S.W.:—

Charles Watkins, Catford	£1,450 10

CHRISTCHURCH (Hants.).—For additions to Bute Farm, for Major Stuart Wortley. Messrs. Lawson & Donkin, architects, Bournemouth:—

George & Harding	£658 0	W. J. Chinchen	£620 0
W. Hoare	640 0	Jenkins & Sons	557 0
Frampton	600 12		

CROGGAN, MULL (N.B.).—For the construction of a pier, for the Argyll County Council. Mr. G. Woulfe Brenan, C.E., Albany-street, Oban. Quantities by the Engineers:—

J. & A. McDougall	£1,153 9 0	Pitcairn, McEvoy, & Co.	£911 14 0
G. Mackay & Son	981 1 5	W. Smith	894 6 10
J. Adam & Co.	975 0 0	J. Bain	
A. McLean	946 19 11		

CROYDON.—For the erection of entrance lodge and stables, Mason's-avenue. Mr. Fredk. West, architect, Croydon:—

W. Akers & Co.	£3,373	W. Smith	£2,900
S. Page	3,200	A. Bullock	2,704
M. Taylor	3,026	E. P. Bulled & Co.	2,687

CROYDON.—For the erection of twelve cottages, Sussex-road. Mr. Fredk. West, architect, Croydon:—

E. P. Bulled, & Co.	£2,192	J. R. Bex	£1,899
E. Goulder	2,160	S. Page	1,716
W. & P. Hards	2,075	A. Bullock	1,589

[All of Croydon.]

CROYDON.—For the erection of an iron Temperance hall, Mint-walk, Croydon. Mr. W. H. Woodroffe, architect, Great Dover-street, S.E. Quantities supplied:—

F. Braby & Co.	£1,460	M. Taylor	£1,055
Croggon & Co.	1,410	W. Smith	1,045
James Smith & Son	1,147	E. J. Sanders	990
W. Akers & Co.	1,085	W. Harbrow	979
G. E. Bryan & Son	1,077	E. Smith*	890

* Accepted.

DEWSBURY.—For alterations to the fronts, &c., of shop premises, Nos. 36 and 38, Northgate, for the Corporation. Quantities by Mr. H. C. Marks, A.M.I.C.E., Town Hall, Dewsbury :—

Wm. Scott & Sons	£428 8 8	Gorthwaite & Blackburn	£380 0 0
J. Richardson & Son	415 12 0	S. Armitage & Sons	375 15 0
T. Fawcett & Son	411 17 1	W. H. Clegg, Dewsbury (accepted)	368 19 4
J. Snowden & Son	400 0 0		

[Engineer's estimate, £375.]

DONCASTER.—Accepted for excavations for sewers on the line of new road across Town Field, for the Corporation. The Borough Surveyor, 3, Priory-place, Doncaster :—
John Nettleton, South-street, Doncaster.... Schedule of prices.

EASTLEIGH (Hants.).—For the construction of roof and additions to the Drill Hall, Desborough-road, for the First Hants Volunteers, S. D. R. A. Mr. R. M. D. Lucas, architect, Southampton. Quantities by the architect :—
G. B. Jordan & Co. £420 7
H. Stevens & Co. (accepted) 420 0
[Both of Southampton.]

FAREHAM.—Accepted for sanitary additions and drainage to the Hants County Asylum, Knowle. J. Robinson, C.E., County Surveyor, Winchester :—
B. Cooke & Co., Battersea £8,074

GILDERSOME (Yorks.).—For the execution of sewerage works, for the Local Board :—

Mitchell & Stephenson	£130 0 0	J. Bateman	£99 6 6
A. Henson	116 0 0	Holdsworth & Son	95 0 0
West & Walker	106 5 0	George Walker, Leeds (accepted, per lin. yd.)	4 6

HARROGATE.—Accepted for the erection of school buildings (Western School) for the School Board. Mr. T. Edward Marshall, architect, Harrogate :—

Excavators', Bricklayers', and Masons' work.—Chas. Dawson, Harrogate	£4,900 0 0
or with Pateley Bridge pitch-faced Wallstones	4,825 0 0
Carpenters' and Joiners' work.—Raworth & Allen, Harrogate	1,992 0 0
Plumbers' and Glaziers' work.—W. & C. Barrand, Leeds	585 0 0
Ironfounders' work.—F. & G. H. Rushworth, Harrogate	388 14 0
Painters' work.—E. Draper, Harrogate	150 0 0
Slaters' work.—Joseph Shepherd, Harrogate	434 0 0
Plasterers' work.—Laycocks & Bros., Harrogate	170 0 0
Concrete.—John Cooke, Huddersfield	593 17 0

HAVANT (Hants.).—For the erection of a ward, and alterations at the workhouse, for the Union Guardians. Mr. H. R. Trigg, surveyor, Hayling, Hants. Quantities by Mr. E. Stallard, surveyor, Havant :—
G. Stallard ..... £378 0 | Mrs. Rogers, Havant* .. £374 15
*Accepted.

KINGSTON-BY-SEA (Sussex).—For the erection of six terrace houses for M. Austin Chubb. Mr. G. Cecil Farr, architect, Lower-road, Shoreham :—

Saunders & Son	£1,594	J. Rooke	£1,575
Brown & Son	1,581	G. Gilliam	1,435
A. Crouch	1,580	Willett	1,415

LISBURN (Ireland).—Accepted for the formation and construction of waterworks (seven contracts), for the Town Commissioners. Mr. John Lanyon, C.E., Northern Bank-chambers, Royal Avenue, Belfast :—
H. & J. Martin, Ltd., Belfast £15,981

LLANDRINDOD WELLS (Radnorshire).—For the erection of five cottages for Mrs. Griffith. Messrs. Owen Morris Roberts & Sons, architects, Portmadoc :—

Willward & Sons	£1,750	J. Hurst, Llandrindod*	£1,190
R. E. Davies	1,350	A. C. Blake	975
G. Price	1,320	*Accepted.	
E. P. Morris	1,297		

LONDON.—For the erection of surveyors' offices for the Wandsworth District Board of Works. Mr. Collings B. Young, architect, Cockspur-street, S.W. Quantities by Mr. William Mills :—

	Amount of Tender.	Extra for Portland Stone.	Fittings.	Totals.
	£.	£. s.	£. s.	£ s.
R. S. Ronald	2,690	40 0	84 0	2,814 0
Hollyway Bros.	2,355	47 10	130 0	2,532 10
Turtle & Appleton	2,276	49 0	77 0	2,402 0
Adamson & Son	2,263	28 10	103 10	2,395 0
J. Carmichael	2,265	33 0	89 0	2,387 0
C. Horton	2,330	47 10	no fittings	2,377 10
H. Brown	2,230	60 0	81 0	2,371 0
Parsons & Co.	2,244	45 0	79 0	2,368 0
R. A. Sewell	2,194	44 2	71 8	2,309 10
J. Allen & Sons	2,125	52 0	130 0	2,307 0
Johnson & Co.	2,120	48 0	83 0	2,251 0
Lorden & Son*	2,100	57 0	79 15	2,236 15
Gregory & Co.	2,077	22 15	82 10	2,182 5

*Accepted.

LONDON.—For the erection of casual wards, Raymond-street, Old Gravel-lane, E., for the Saint George's-in-the-East Union Guardians. Messrs. Wilson, Son, & Aldwinckle, architects, 1, Victoria-street, S.W. Quantities by Mr. Stafford Elsmore, 13, Clifford's Inn, E.C. :—

R. A. Lowe	£17,573	C. Wall	£15,682
F. Dupont	17,104	H. L. Holloway	15,637
Hearle & Farrow	16,900	Kirk & Randall	15 214
W. Shurmur	16,200	H. Wall & Co.*	15,060
E. Ambrose	15,899	*Accepted.	

LONDON.—For the erection of premises Nos. 40 and 42, Powis-st., Woolwich, S.E., for Mr. E. Carter. Mr. H. H. Church, architect, William-st., Woolwich. Quantities by Mr. W. Whincop, 15, Kyverdale-rd., Stoke Newington, N. :—

Multon & Wallis	£2,125	H. Brown	£1,970
Young & Lonsdale	2,080	J. Chapman	1,937
Balaam Bros.	2,060	H. L. Holloway	1,930
E. Proctor	1,995		

LONDON.—For the erection of stables, &c., in the Coleraine-road, Westcombe Park, for Mr. E. Pembroke. Messrs. Edmeston & Gabriel, architects, 42, Old Broad-street. Quantities by Messrs, Parr & Sons, Broad-street House, E.C. :—

Havill	£1,812	Jerrard	£1,689
W. A. Prior	1,803	Young & Lonsdale	1,675
Banks	1,743	J. Carmichael	1,639
Godson & Sons	1,695	Balaam Bros.	1,560

LONDON.—For the erection of premises, Nos. 26 and 28, Powis-street, Woolwich, for Mr. H. J. Smith. Mr. H. H. Church, architect, William-street, Woolwich. Quantities by Mr. W. Whincop, 15, Kyverdale-road, Stoke Newington, N. :—

Multin & Wallis	£1,999	H. Brown	£1,815
J. Chapman	1,938	Balaam Bros.	18,00
W. Martin	1,900	H. L. Holloway	1,800
T. D. Leng	1,890	E. Proctor	1,772
Young & Lonsdale	1,860		

LONDON.—For additions and alterations to the "Joiners' Arms" Inn, Denmark Hill, S.E., for Mr. Mark Wheeler. Mr. Joseph G. Denton, architect, Edith-grove, Chelsea :—

		Allowed for old materials.	Total.
Holliday & Greenwood	£1,690	.... £40	.... £1,650
Hall, Beddall, & Co.	1,645	 45	 1,600
King & Son	1,415	 15	 1,400
G. W. Ford	1,430	 40	 1,390

LONDON.—Accepted for alterations in connexion with lift at Billiter-buildings, for the International Corporation, Ltd. Mr. F. H. Holdsworth, architect :—
Henry Line, Upper Thames-street £219

LONDON.—Accepted for fittings and decorative work at the Pelican Club, Gerrard-street :—
Henry Line, Upper Thames-street £149

LONDON.—Accepted for decorative work at 2, Lime-street, for the National Telephone Company :—
Henry Line, Upper Thames-street £139

LONDON.—For making up Griffin-road, for the Plumstead Vestry. Mr. W. C. Gow, C.E., Vestry Hall, Maxey-road, Plumstead, S.E. Approximate quantities by the Engineer :—

Asphaltic Limestone Concrete Company	£881 18 9	H. Crane	£766 18 0
Fry Bros.	804 9 8	John Mowlem & Co.	728 0 0
Mayo & Co.	790 10 0	W. H. Wheeler	711 18 0
		Hobman & Co.*	164 9 0

*For paving only.

LONDON.—For additions and alterations to the "New Queen's Head," 144, Stockwell-road, for Henry H. Finch, Esq. Mr. Joseph G. Denton, architect, 77, Edith-grove, Chelsea, S.W. :—
Bryne & Wright ..... £496 17 6 | Sorrell & Co., Chelsea* £481 2 0
*Accepted.

LONG EATON (Notts.).—For additions to "Belfield," for Mr. F. R. Claye. Mr. Ernest R. Ridgway, architect, Long Eaton :—
Dennett & Ingle, Nottingham £685

LONG EATON (Notts.).—For sewering, forming metalling, &c., two new streets, for the Long Eaton Working-Men's Co-operative Society, Limited. Mr. Ernest R. Ridgway, architect, Long Eaton :—

F. Meeson	£1,130 0	Bradley	£950 6
Hipwell	1,100 0	Hawley & Son, Ilkeston*	819 0
Barry	1,055 2	*Accepted.	

LUDLOW (Salop.).—Accepted for the execution of sewerage works (five contracts), for the Rural Sanitary Authority. Mr. W. Wyatt, Engineer, Pride Hill-chambers, Shrewsbury :—

Glazed Earthenware Pipes.
H. Wyndham, Ruabon ..... Schedule of prices.
Pipe Laying.
J. Brown, Ford, Shrewsbury ..... Schedule of Prices.
Cast-iron Covers.
Newby & Son, West Bromwich, manhole covers.... £1 1 0
" " lamphole covers .. 0 14 9

MANSFIELD.—For the execution of waterworks, including pumping-station, pumping and gravitation mains, Rainworth, Berry Hill Service Reservoir. Mr. George Hodson, Engineer, Mansfield. (Contract No. 22) for the Corporation :—

Fotherby & Sons	£22,845	H. Shardlow	£21,700
J. Greenwood	22,500	J. H. Vickers	21,804
Williamson & Co.	22,360	J. F. Price	21,500
Kirk, Knight, & Co.	22,248	T. Smart	21,400
Jenkins & Son	21,949	J. Tomlinson, Derby*	21,344
		*Accepted.	

MERIONETH.—Accepted for alterations, &c., to school buildings, Penrhyn and Talysarnan, for the U. D. School Board. Messrs. Owen Morris Roberts & Sons, architects, Portmadoc :—
William Morris & Evans, Talysarnan £490

MEXBOROUGH (Yorks.).—For the execution of sewerage works (1,070 yards) for the Local Board. Mr. W. A. Palliser, C.E., Public Offices, Mexborough. Quantities by the Engineer :—

G. R. Hall	£673 3 6	Geo. Hall	£312 18 4
Geo. Brooks	460 0 0	Jno. E. Nadin, Crookes, Sheffield*	267 14 5
Jno. Nelson	435 4 8	Geo. Walker	258 18 0
G. Blackburn & Sons	403 13 0	*Accepted.	

[The above tenders are for labour only.]
[Engineer's estimate, £315.]

MOUNTAIN ASH (Glam.).—For the construction of about 30 chains of road from Drainenwen to Aberdare Junction, for the Local Board :—

R. J. Matthias	£1,314 13 4	Barnes, Chaplin, & Co.	£1,040 7 6
Lloyd & Powell	1,306 14 10	Williams, Bros.	992 18 9
Thos. Davies	1,224 10 0	Thomas Taylor	974 1 8
J. H. Firbank	1,116 13 4	Batchelor & Snowden, Cardiff*	957 16 10
D. Evans & Son	1,106 10 0	*Accepted.	

NEW MALDEN.—For alterations and additions to premises, Mr. T. V. Herbert Davison, architect :—

Glass	£29	J. Saunders, New Malden*	£127
A. Collis	183	*Accepted.	

NEWMARKET.—Accepted for the supply of 800 tons granite metalling 1½-in. gauge, for the Local Board. Mr. John W. Metcalf, A.M.I.C.E. :—
Ellis & Everard, Bardon Hill, 12s. 6d. per ton, delivered at Newmarket.

NOTTINGHAM.—For the erection of billiard and club-room, &c., Stapleford, for the Stapleford Co-operative Society, Limited. Mr. Ernest R. Ridgway, architect, Long Eaton :—

Bastable	£693 0	J. Martin, Stapleford*	£678 15
F. Martin	693 0	Pacey & Henson	635 0
J. Bull	680 0	Moult	621 0
		*Accepted.	

PENMORFA (N. Wales).—Accepted for additions to school buildings, Gwm Penmorfa and Brynteg, for the U.D. School Board. Messrs. Owen Morris Roberts & Sons, architects, Portmadoc :—
D. M. Roberts, Penhefelin, Tremadoc £390

PUTNEY.—For alterations and additions to the "Cricketers' Inn," Lower Richmond-road, Putney, for Mr. Frank Alexander. Mr. Joseph G. Denton, 77, Edith Grove, Chelsea, S.W. :—

Thomas Grant, Putney	£590 0	Frank Orfeur, Brixton*	£387 10
George Ford, Vauxhall	397 0	*Accepted.	

RUABON (N. Wales).—For additions, &c., to school buildings, Ponkey, for the School Board. Messrs. J. Morison & Son, architects, Wrexham :—

Jenkins & Jones	£365 0	John Davies, Ruabon*	£245 15
H. & J. Jones	275 0	*Accepted.	

SANDBACH (Cheshire).—Accepted for supplying cast-iron water-pipes, hydrants, valves, &c., for the Rural Sanitary Authority. Mr. W. Wyatt, Engineer, Pride Hill-chambers, Shrewsbury :—

Pipes.
J. & S. Roberts, Swan Village, West Bromwich—
5 in. pipes, per ton £4 5 9
3 " " " " 4 7 6
Pipe-laying.
Newall & Evans, Sandbach—
5 in., per yd. 0 0 8
3 " " " 0 0 7½
Valves, &c.
The Glenfield Co., Kilmarnock—
5 in. 2 1 9
4 " 1 13 9
3 " 1 5 6

SAXMUNDHAM.—For the erection of school buildings for the School Board. Mr. T. E. Key, architect, Aldeburgh-on-Sea, and 5, Bloomsbury-square, London, W.C. :—

G. O. Knowles	£2,052 0 0	G. Barrells	£1,732 0 0
Cutting & Sons	1,894 0 0	W. J. Smith	1,720 0 0
R. Leggett	1,804 6 6	Carter & Son, Saxmundham*	1,565 0 0
Gibbs & Sons	1,800 0 0	*Accepted.	

SHIRLEY (Hants.).—For the supply of about 400 tons broken granite, for the Local Board. Mr. H. J. Batten, Surveyor, Shirley, Southampton :—

		Per ton. s.	d.
Old Radnor Stone Co.	(Kingston stone)	14	1
Sandell Brothers	(Guernsey ")	11	8
"	(Cherbourg ")	11	0
"	(French Red ")	10	3
Wm. Griffiths	(Guernsey ")	11	2
C. Francis, Son, & Co.	(" ")	11	1
Mowlem & Co.	(" ")	11	0
J. Hamley	(" ")	11	0
A. & F. Manuelle, Leadenhall-street (accepted)	(" ")	10	10
Porthgrain Granite Co.	(Porthgrain ")	10	9
L. Sommerfeld	(Lessinnes ")	10	0
Wm. Hamblin	(Cranmore ")	8	3
"	(Winsor Hill ")	7	3

SLOUGH.—For the erection of a block of four cottages on the Myrke Estate, for Mr. T. C. Moore. Messrs. Nottage & Sammons, architects, Slough and Windsor :—

J. Deverill	£1,200	H. J. Grove	£1,063
G. Wernham	1,196	N. Grove	1,058
W. Ashfold	1,190	A. A. Reavell	1,038
G. Hearn	1,150	J. Atkins	875
C. Simmons	1,100	G. Bennett	873
H. D. Bowyer	1,080	R. Bishop, Windsor*	860
		*Accepted.	

ST. MARGARETS.—For the erection of two houses. Mr. M. P. L. Racer, architect, Brackley-terrace, Chiswick :—

Emmett	£596 13 0	Wilcox	£464 0 0
Morgan	530 0 0	A. Collis	461 0 0
Arnold	517 10 0	Collis*	402 3 2½
Snell	497 0 0	*Revised and accepted tender.	

UXBRIDGE.—For the erection of shop premises, Nos. 7 and 8, High-street, for Messrs. Garrick & Coles. Mr. W. L. Evens, architect :—

Brown & Sons	£1,418	H. Grainge	£1,335
A. & B. Hanson	1,340	C. F. Keasley, Uxbridge*	1,322
		*Accepted.	

LONDON.—For making up and paving Comeragh-mews, Gowan-avenue, Silvio-street, Bovingdon-road, and Perrymead-street, for the Fulham Vestry. Mr. Charles Bestwell, Surveyor, Town Hall, Walham Green, London, S.W. :—

	Concrete Mews.	Silvio-street, Sec. I.					Perrymead-street, Sec. I.					Bovingdon-road.					Gowan-avenue, Sec. I.				
	Roadway.	Roadway.	York.	Victoria.	Industrial.	Imperial.	Adamant.	Roadway.	York.	Victoria.	Industrial.	Imperial.	Adamant.	Roadway.	York.	Victoria.	Industrial.	Imperial.	Adamant.	Roadway.	York.	Victoria.	Industrial.	Imperial.	Adamant.
	£ s.	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£ s.	£	£	£	£	£
Mears	135 0	254	128					195	112				81	430	293					198 10	177				129
Wimpey & Co.	275 0	337	152					190	133					486	349					200 0	219				
Robertson & Grant	191 0	230	127					237	115					508	397					367 0	180				
Nowell & Robson	138 0	297	130		91			203						495						235 0	178				
Greenham	165 0	230				85		170						475			79			200 0					
Rogers & Co.	154 0	283						225						533			75			250 0					
Bell		239		108				171		90				447	392			86		191 0					
Vickers Stone Co.																									
Imperial Stone Co.	149 10					97		221												270 0					
Adams	185													555											

* Unsigned.

SLOUGH.—For the erection of factory, machinery hall, and two shops and dwelling-houses, for Messrs. Elliman, Sons, & Co. Messrs. Nottage & Sammons, architects, Slough and Windsor:—

W. Watson	£6,988	J. Daverill	£6,300
Patman & Fotheringham	6,951	C. F. Kearley	6,383
A. Jackaman	6,930	G. S. Lewis	6,200
T. Nye	6,885	A. A. Reavell	5,810
T. J. Messom	6,603	H. Flint, High Wycombe*	5,687
H. D. Bowyer	6,682	Hollis & Son (withdrawn)	5,639
B. E. Nightingale	6,590		

*Accepted.

SLOUGH.—For the construction of a road between Mackenzie-street and William-street, and making two sewers, for the Trustees of the late F. Charsley. Messrs. Nottage & Sammons, architects, Slough and Windsor:—

A. Jackaman	£959	T. Kelly	£822
H. Hill	918	H. D. Bowyer, Slough*	820
H. Morecraft	825		

*Accepted.

SOUTH MOOR (Co. Durham).—Accepted for the erection of a Wesleyan chapel and school, for the Trustees of South Moor Wesleyan Chapel. Mr. J. W. Thompson, architect (of Messrs. Thompson & Selby), Newcastle. Quantities by architect:—

Alf. Routledge, Thorneycroft-terrace, Stanley £1,325

WATERFORD (Ireland).—For the execution of waterworks, Tramore, for the Union Guardians. Mr. Duffin, County Surveyor, Waterford:—

Jno. Cunningham	£6,172 0 0	P. Harney	£4,325 17 9
Johnson	5,800 0 0	Hickson & Peat,	
Walsh	5,419 12 2	Tralee (accepted)	4,076 10 11

WILSDEN (Yorks.).—Accepted for the supply of 8,748 yds. C I pipes, valves, hydrants, &c., and laying, jointing, testing, &c., the same, for the Local Board. Messrs. W. B. Woodhead & Son, Civil Engineers, 18, Exchange, Bradford:—

Contract No. 1.—Pipes.—Clapham Bros., Keighley £1,282 0
Contract No. 2.—Valves, &c.—J. Blakeborough & Sons, Brighouse 112 15
S. Greenwood & Son, Wilsden 858 12

TO CORRESPONDENTS.

S. S. P. (amounts should have been stated).—J. P. (ditto).—O. M. R. & Sons (partly unintelligible).—"Young Builder" (we have no doubt the state of the mortar you describe is the result of absorption of the bricks, but we can only recommend a liberal wetting of the bricks if a less porous brick is not to be had in the country. As to books, write to Crosby Lockwood & Co., publishers, London, for their list).

We are compelled to decline pointing out books and giving addresses.

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Advertisements for the current week's issue are received up to THREE o'clock p.m. on THURSDAY, but "Classification" cannot be guaranteed for any which may reach the Office after HALF-PAST ONE p.m. on that day. Those intended for the front Page should be in by TWELVE noon on WEDNESDAY.

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*3. St. Alban's	*11. Lincoln	19. Southwell	*26. York
*4. Peterboro'	12. Gloucester	20. Worcester	*27. Ripon
*5. Wells	13. St. Paul's	21. Bangor and 22. St. Asaph	28. Chester
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8. Bristol	16. Ely	*23. Winchester	*31. Durham

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2. Edinburgh	5. Iona	
3. Aberdeen	6. Dunblane	10. Elgin
	7. Dunkeld	

IRELAND.
(April to June, 1894.)

1. St. Patrick's | 2. Christchurch | 3. Kilkenny.

THE ABBEYS OF GREAT BRITAIN.
1894.

1. Westminster	*Jan.*	3. Glastonbury	*Aug.*	6. Bath	*Nov.*
2. Rievaulx	*July.*	4. Croyland	*Sept.*	Tewkesbury	*Dec.*
		5. Whitby	*Oct.*		

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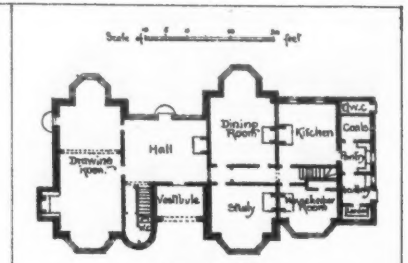
Entrance · Front. R.A. Briggs. Arch[t].



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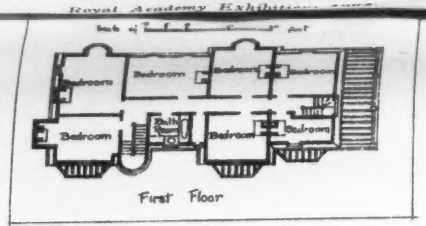

First Floor

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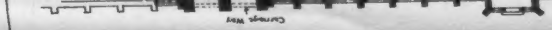
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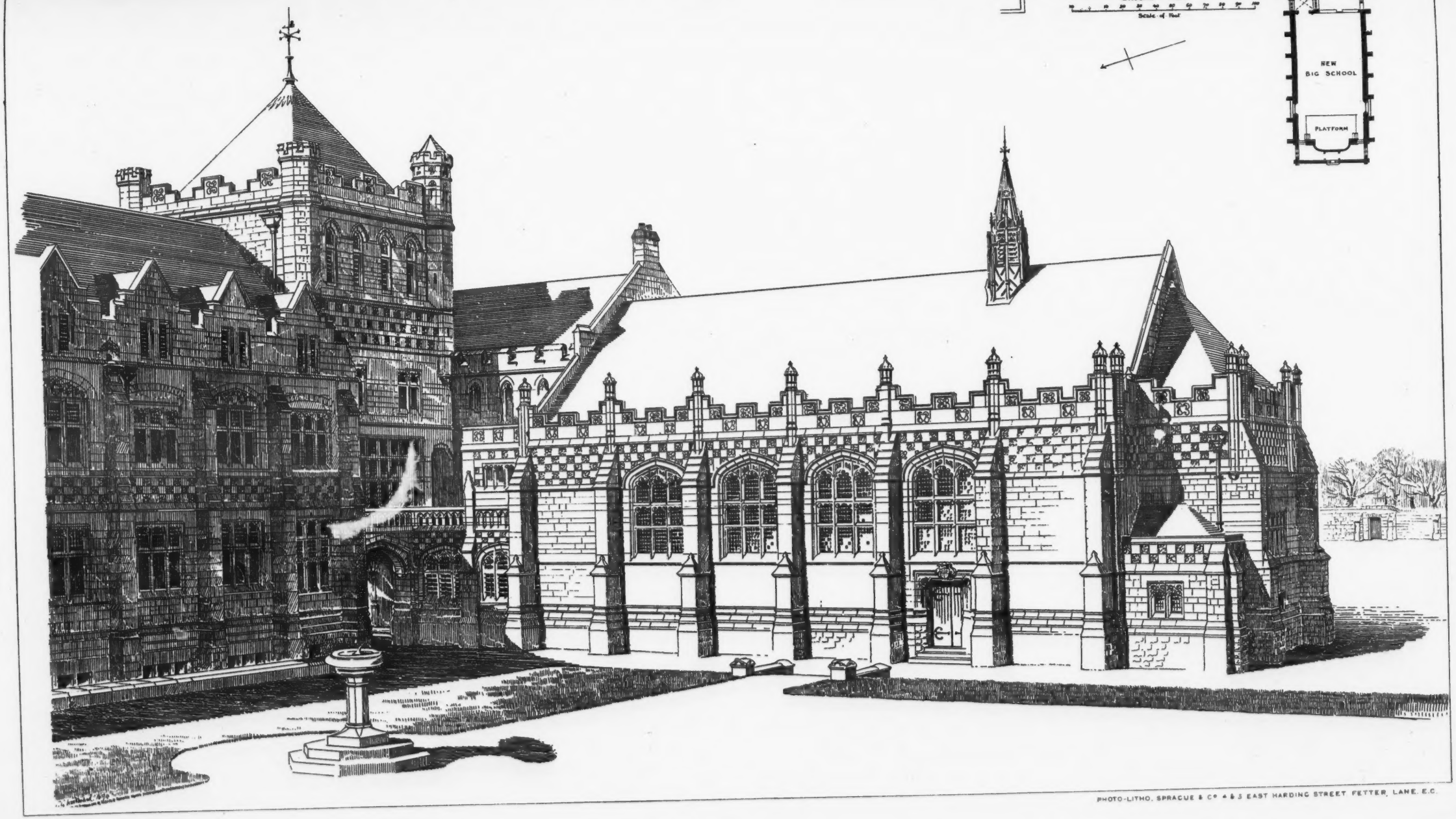

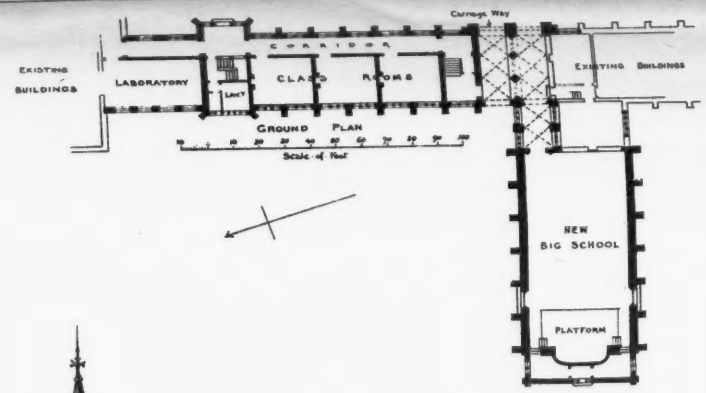

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